Workstation Software

Fuze

Edit Tool

User Guide

Fuze Edit Tool User Guide

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User Guide Version 3.7 for the Fuze Edit Tool Version 3.7

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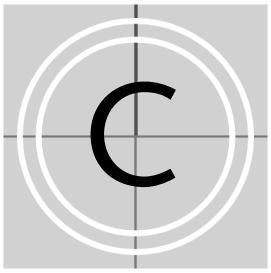

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Introduction

This documentation describes how to use the Edit Tool of Fuze manufactured by DVS.

Fuze is a powerful delivery system for digital cinema content that can be used, for example, to create encrypted or unencrypted Digital Cinema Packages ready for shipment to cinemas. Furthermore, it handles stereoscopic content just as easily as if it were 2D material, including subtitles. Video data is stored and worked with in its original uncompressed format, independent of resolution, color space and bit depth. All formats and resolutions can be processed, from SD up to 2K, and the final result can be played out in a freely selectable format. Conversions and calculation times for render processes are rarely necessary because of the high-quality hardware developed by DVS. Additionally, up to 16 channels of audio can be output by Fuze and their data can be accessed and processed in the software as easily as the video material. All video and audio data are stored in the Windows file system and thus accessible right away when working with other applications.

The Edit Tool of Fuze is the main part of the DVS software package. It is a software module that enables you to add video and audio clips to a timeline in any sequence you like and in a freely configurable number of tracks. When working with video you can edit your material with cuts, dissolves, wipes, etc. Thus you can create your perfect project. When working with audio, you can control the volume of a clip at every position in the timeline, for example, to create fade-ins and -outs. During all times your original material is never touched or altered because all editing processes are performed virtually. For the mastering of digital cinema content there is also an advanced tool available. Once your project is finished, you can finalize it and save the edited clips in any video and file format you like.

Further important features of the Edit Tool are:

– Projects can be finalized to a clip (render function),
– automatic and adaptable scaling of video material in the timeline (autoscale),
– 1D and 3D LUT support,

– hardware accelerated JPEG2000 compression and real-time play-out of JPEG2000 encoded material,
– archive function for projects,
– an automatic defragmentation of the main storage for an optimized real-time performance.

1.1 Overview

This user guide informs you about the general handling of the Edit Tool as well as of its complete controllable interface.

The chapters in this user guide contain the following information:

Chapter 1	Begins with a short introduction to Fuze and the Edit Tool, followed by a note regarding the audience this manual is written for and an explanation of the conventions used in this manual. Additionally, it provides important notes that you should read.
Chapter 2	Contains basic information about the Edit Tool. Here you can find information about the software structure as well as a first overview of the user interface of the Edit Tool. Furthermore, this chapter provides some general notes, for example, about how to manage projects with the DVS software.
Chapter 3	In addition to the information how to start and exit the program, you can find a beginner's tutorial which explains shortly how to work with the Edit Tool and how to start your first project in this chapter.
Chapter 4	Explains the tool area of the Edit Tool.
Chapter 5	This chapter describes the control area and the video overlay of the Edit Tool.
Chapter 6	In this chapter the timeline of the Edit Tool and timeline related tasks are described.
Chapter 7	This chapter explains and describes the timeline element properties of video clips and transitions. Individual effects that a video clip may provide are explained as well.
Chapter 8	Provides information about the individual menu options of the menu bar of the Edit Tool.
Appendix	Gives additional information about the software. Among others you can find here a glossary of terms used in this user guide and the file formats that are supported by the DVS software.
Index	This chapter facilitates the search for specific terms.

1.2 Target Group

To use this user guide and the Edit Tool correctly you should have experience in PC handling and be familiar with the hardware handling of a video system. If you want to use the software to its full potential, you should also have extensive knowledge in the field of digital video.

Furthermore, to use the DVS system in connection with other equipment, e.g. a VTR, you should know how to handle this equipment.

1.3 Conventions Used in this User Guide

The following typographical conventions will be used in this documentation:

- Texts preceded by this symbol describe activities that you must perform in the order indicated.

– Texts preceded by this symbol are parts of a list.

Texts preceded by this symbol are general notes intended to facilitate work and help avoid errors.

You must pay particular attention to text that follows this symbol to avoid errors.

“ ” Texts enclosed by quotation marks are references to other manuals, guides, chapters, or sections.

’Window’	Text in bold with single quotation marks indicates a window name
BUTTON	Text in small caps and bold indicates a push button
Group/Menu	Text in italic and bold indicates either a group name, menu name or options in a menu list
Menu » Option	In the specified group or menu select the stated item
Item	Text in bold only stands for other labeled items of the user interface
File	Directory structure or file
Entry	Parameters, selections or entries made in the program; it may also indicate a file syntax or contents of a file
[Key]	An individual key or a key combination on a keyboard

Keyboard Shortcuts

To perform options or procedures with the keyboard often requires a simultaneous pressing of two keys.

Example:

[Ctrl + F1]	If this is given, hold down the [Ctrl] key and press simultaneously the [F1] key.

Screenshots

The screenshots shown in this documentation may differ from the user interface(s) displayed on your system. They may have been taken, for example, from previous/pre-release software versions or from other systems with a similar user interface. However, they should contain the items required to understand the described actions.

3D/Stereoscopy and Digital Cinema

The items available to create and use 3D/stereoscopic material or digital cinema content are not described in this manual. These are, for example:

- the menu option ***Digital Cinema Delivery Tool...***,
- the menu option ***Load KDM...***,
- the tab **DC reels**,
- the **Stereoscopic output** setting(s), as well as
- any other 'DC', 'CPL', 'subtitle', 'stream' (video), or 'eye' concerned item.

Descriptions of them can be found:

- In the "Fuze DCI Mastering" supplement user guide.
- In the "Fuze 3D/Stereoscopy" supplement user guide.

These documents can be accessed via the software's online help (see section "Manuals" on page 8-21).

1.4 Important Notes

Please observe the following while using the Edit Tool:

Only use the designated video drive (main storage) to store video and audio data. Other storage locations will be too slow for real-time operations.

Leave about 15% of the overall main storage capacity empty of data for real-time performance reasons.

The real-time capability of Fuze depends to a large extent on the performance of the system's hardware. Therefore, it is recommended to terminate all other programs when working with the DVS software.

After copying large amounts of data to the main storage, it is recommended to leave the DVS software running for a longer period of time (e.g. over night) without performing any real-time tasks (play-out) or having the slave mode activated. This will give the built-in defragmentation tool time to reorganize the files on the storage for an optimized real-time performance. For this the automatic starting of the defragmentation tool has to be enabled.

Your DVS system has been tested thoroughly and is very reliable. However, because of the vast amount of third-party software available, its reactions on the installation of such could not be tested. The installation of third-party software may disrupt the real-time capability and/or limit the functionality of your system.

1.5 New in the Edit Tool

The following lists the most important features and functions that were new in the latest versions of the Edit Tool:

Please note that the features and functions mentioned may be part of optional packages.

For further information about new features please refer also to the release notes of the DVS software.

New in Version 3.5

– 3D/stereoscopic subtitles for DCI Mastering

New in Version 3.3

– Timeline tracks can be added or removed via context menu
– For output (finalizing) the reel name can be configured in the Configuration Tool
– Support of subtitles for DCI Mastering
– MPEG Interop as well as CPL-only creation via the digital cinema delivery tool
– 3D single stream formats for finalizing and the digital cinema delivery tool (for intermediate states towards a DCP)

New in Version 3.2

– Support of several new file formats
– Finalizing of mono audio files
– Introduction of a system specific Signing Key for the DCI Mastering

New in Version 3.1

– Support of 3D material and stereoscopic digital cinema packages

New in Version 3.0

– Clipwise rendering for finalizing
– Frames/fields display mode
– Support of source timecode for audio in the timeline
– Enhanced keyboard shortcuts

Basics

The Edit Tool is one of the software modules of the DVS software and thus part of the software package for Fuze. This chapter provides first some background information about the structure of the DVS software which includes a short overview of its different modules. After that an overview of the user interface of the Edit Tool is provided to familiarize you with its appearance. This will be followed by a description of the task bar of the software. The chapter will be concluded with some general notes, for example, about how to manage projects with the DVS software.

2.1 Overview of the Software Structure

The software package for the DVS system consists of various individual programs and modules that combined provide the system's unique capabilities to process digital video and audio in real time. The following diagram shows the communication processes between individual software parts and some hardware components in detail:

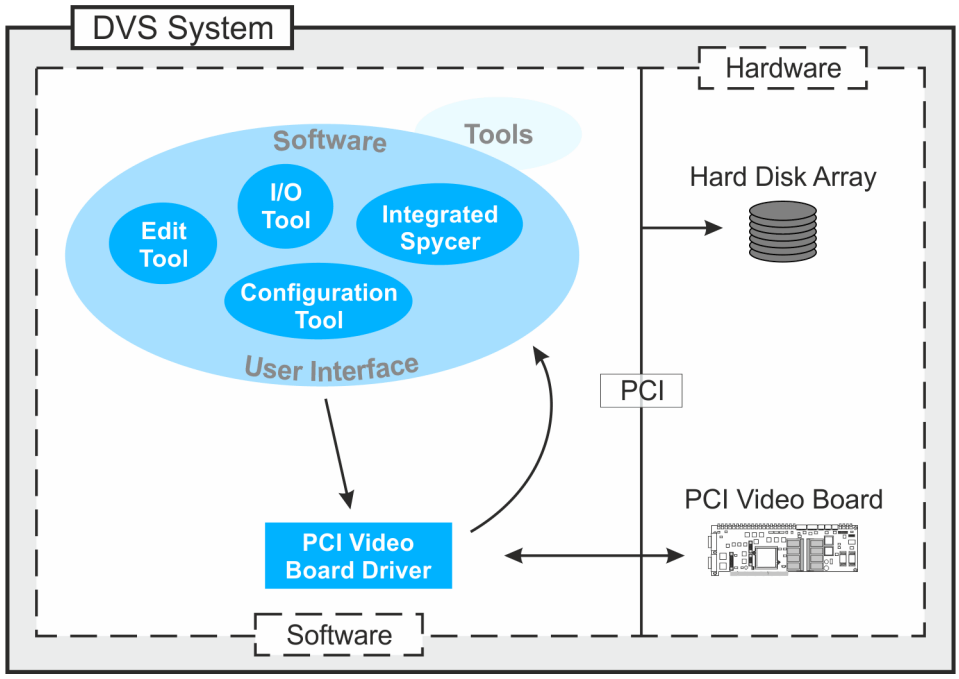


Figure 2-1: Structure of software

Video Board and Driver

The central core of the whole system is the DVS PCI video board and its driver because they provide the functionality of the video system. Without them the system would not be able to display any video signals nor would the DVS software components be operational.

The PCI video board driver controls the video board and thus the output of video signals. It runs in the background of your video system and is therefore not visible.

Software User Interface and Software Modules

The software user interface is the visible part of the DVS software package. It consists of individual software modules which control the DVS system and are used to perform editing and video as well as audio processing tasks. These modules are the Edit Tool, the I/O Tool (optional), the Configuration Tool and Spycer, the innovative content management software by DVS. They are the basic software modules of the DVS

system, i.e. the ones that you will use most in your every day work. You can see them in the drawing above in the oval 'Software User Interface'.

Depending on your system configuration there may be other tools and modules available on your system. Further information about these can be found in their respective user guides.

Once the DVS software is started, you can access the different modules available on your system easily via the task bar of the user interface (see section "The Task Bar" on page 2-7).

The Edit Tool

The Edit Tool is the software module that allows you to assemble video and audio material on a timeline and edit them with cuts, dissolves, wipes, etc. Clips of different formats and resolutions can be added to the timeline. Additionally, in this module you can perform a DCI Mastering and create properly encoded and encrypted digital cinema packages (DCPs, see the "Fuze DCI Mastering" supplement accessible via the software's online help). The Edit Tool module supports edit decision lists of various formats via export function. One of the main features of the Edit Tool is that all editing tasks are performed virtually, i.e. the original material on the storage is never altered. The clips used in the DVS software are only representations of the original material on the storage. With this you can use the same material over and over again.

The I/O Tool

The optionally available I/O Tool is mainly used for the digitization of a variety of different input sources, meaning the recording/capturing of video and audio data with the DVS system from other sources than computer storages. You can capture material from any source you like and record it in a freely selectable format, with or without color space conversion. For instance, you can capture data from telecines, VTRs, or even cameras – as desired in an automated batch processing mode or manually. Of course, playing out the recorded material as well as of all other clips present on the system can be performed without any effort as well. Furthermore, the processing of data lists is fully supported in the software, for example, via import and export functions.

Integrated Spycer

With Spycer, the innovative content management software by DVS, you can manage your content easily. It is a software application capable of handling large amounts of video data and their corresponding metadata, providing you with integrated browse, search and management tools to retrieve data and gather information about them locally as well as via a network. Additionally it can be used to preview clips and add them to the bin of the DVS software, thus offering you even more pos-

sibilities than a file manager. Spycer is already integrated in the DVS software. It can be accessed the same way as the other software modules and is thus not needed as a stand-alone application. For Fuze users it comes with the complete feature set and, furthermore, works seamlessly together with other available DVS products, such as the DVS-SAN.

The Configuration Tool

For the configuration and setup of the whole DVS system and its software you can use the Configuration Tool. Here you can set up, for example, the period for the automatic save function of the project file (autosave) as well as more software specific settings, such as the bin properties.

Tools and Services

Also part of the DVS software are various tools that can be used for a more basic configuration of the DVS system or may be of help during service and maintenance tasks, e.g. monitoring and error diagnostics of the hard- and software.

For instance, among them you can find the defragmentation tool which is a process automatically started with the DVS software and running in the background of the system. During stand-still times of the system the defragmentation tool will reorganize the files present on the storage for an optimized performance of real-time tasks such as a play-out. Among the tools it is the only process that runs in the system's background.

Most other tools delivered with the DVS software are used during the initial configuration and setup of the system only. In your daily work with the DVS system they are of no use.

Further information about the tools in general can be found in the "Fuze Tools and Services" user guide accessible via the PDF files of the software's online help. For additional information about the defragmentation process in particular please refer to section "The Automatic Defragmentation Process" on page A-20.

2.2 Overview of the User Interface

The following figure shows the user interface of the Edit Tool as it appears after starting the DVS software (for information on how to start the software see chapter “Getting Started” on page 3-1):

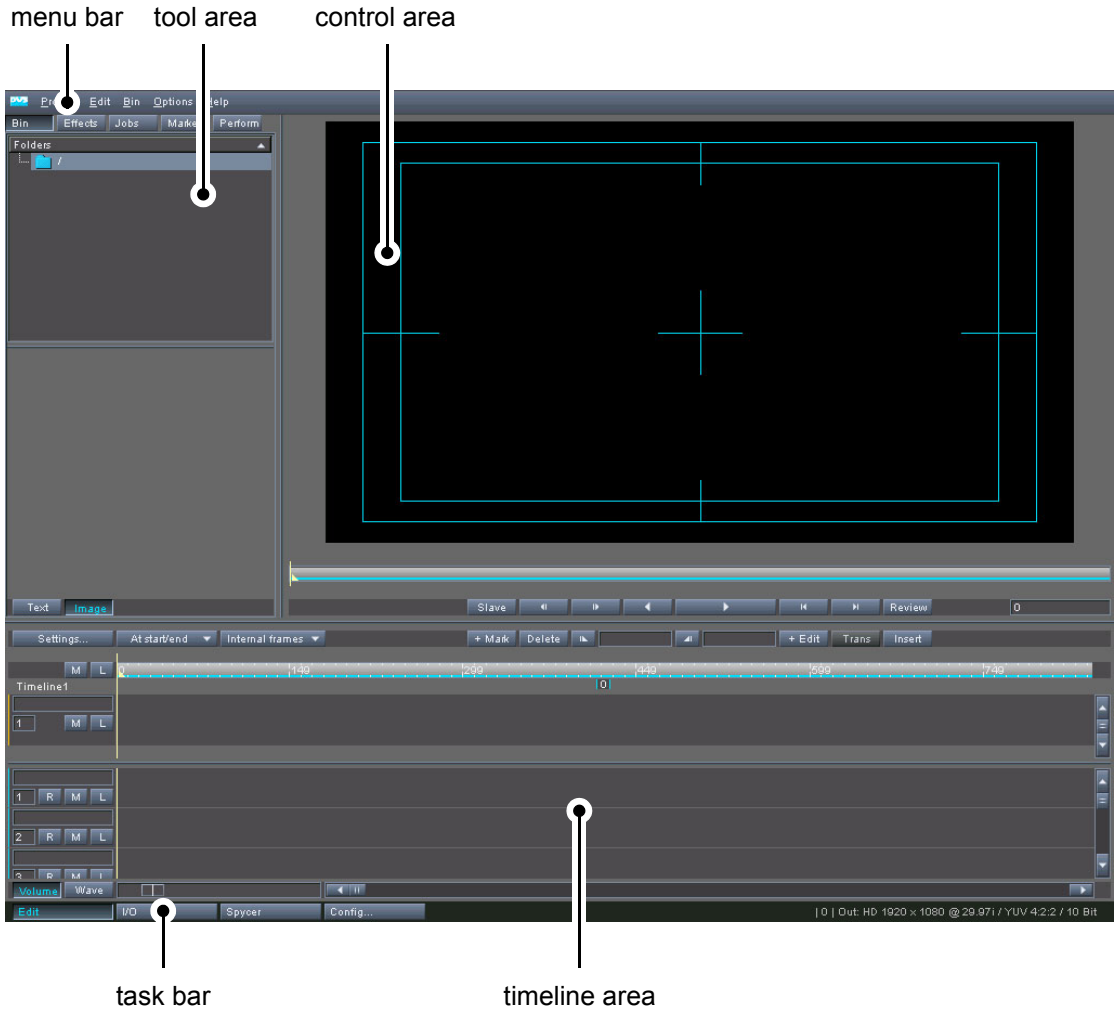


Figure 2-2: User interface of the Edit Tool

The DVS software is designed to run in full-screen mode to provide for an undistracted view on the video material and the editing task at hand. To switch to the operating system environment use the [Windows ( )] key on your keyboard or select from the menu of the program icon on the menu bar the menu option ***Minimize*** (see section “Minimize” on page 8-2).

Via the check box **Don’t show this message again** offered by information messages of the DVS software you can deactivate the appearance of this particular message for the current software session (i.e. next session it will be displayed again).

After starting the DVS software the Edit Tool software module is activated automatically. Here you can see the following items:

menu bar — At the top of the user interface you can find a menu bar. This menu bar provides access to functions and tasks of an administrative nature for the DVS software. Here you can find, for example, import and export functions as well as several menu options generally concerned with projects and project files. A description of the menu bar can be found in chapter "The Menus" on page 8-1.

tool area — Directly below the menu bar you can find the tool area which may show you depending on the currently active software module and/or on the optional features available various tools that can be used during your work with the system. The tools are provided as tabs to switch easily between them. By default you can find among the tools, for example, the bin which provides initial access to the video material. For more details about the tool area and the individual tools see chapter "The Tool Area" on page 4-1.

control area — To the right of the tool area you can find the control area. In the Edit Tool this area is used to pre- and review your current project. At the top you can find the video overlay where you can see the video material. Below the video overlay a scrub bar of the timeline is available. In contrast to the timeline in the timeline area where you can zoom in and out, the scrub bar always shows the complete timeline of the project. Below the scrub bar the controls are located to play out and move within your current project. The control area will be described in chapter "The Control Area" on page 5-1.

timeline area — In the timeline area you can find the video and audio tracks. Most of the editing tasks are performed here, for example, by cutting and arranging clips. The timeline area can be configured freely and thus be adapted to your individual needs. This area and how to work with projects in the timeline are explained in chapter "The Timeline" on page 6-1.

task bar — The user interface provides at its bottom a task bar where you can switch between the different software modules of the DVS software. The task bar is available in most modules and you can easily start and switch between them. It will be described in more detail in section "The Task Bar" on page 2-7.

2.3 The Task Bar

The user interface provides at its bottom a task bar where you can switch between the different software modules of the DVS software. The task bar is available in most modules and with it you can easily switch to another module.

After starting the DVS software the Edit Tool is started automatically (

). When you click on one of the inactive buttons in the task bar, the respective software module will be loaded, most of them in the upper part of the user interface. The task bar provides the following buttons:

The **EDIT** button activates the Edit Tool of the DVS software. This software module allows to edit video material. It is automatically active after starting the software and described in this user guide.

The **I/O** button starts the I/O Tool of the DVS software. You can use it to capture video and audio material with the DVS system from telecines, VTRs, or cameras. You can find further information about the I/O Tool in the "Fuze I/O Tool" user guide.

With the button **SPYCER** you can activate the local content management software by DVS where you can browse and/or search for data on local and network storages. Its management tools allow you, for example, to defragment data as well as to define or alter metadata. Additionally, you can preview clips and add them to the bin of the DVS software by a simple drag-and-drop procedure. Spycer is described in the "Spycer" user guide.

The **CONFIG...** button opens the Configuration Tool. Here you can configure and set up the whole video system and the software. With it you can, for example, set up the period for the automatic save function of the project file (autosave) as well as more software specific settings, such as the bin properties. More information about the Configuration Tool as well as various other configurations that can be performed can be found in the "Fuze Configurations" user guide.

For a more detailed description of all basic software modules as well as other parts of the software together with references to their descriptions, please refer to section "Overview of the Software Structure" on page 2-2.

Additionally, you can find at the bottom right of the task bar several items which will provide you with information about the currently loaded project, the duration of its timeline in total and the set video output format for the timeline:

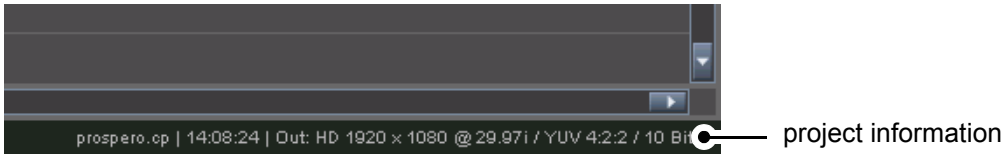


Figure 2-3: Project information

The timeline's duration shows you the duration of all clips present in the timeline tracks and depends on the currently selected video output raster (frame rate).

Furthermore, to the right of the task bar you can find some status messages. They will be displayed as soon as project relevant tasks are performed, for instance, when a project is loaded or saved.

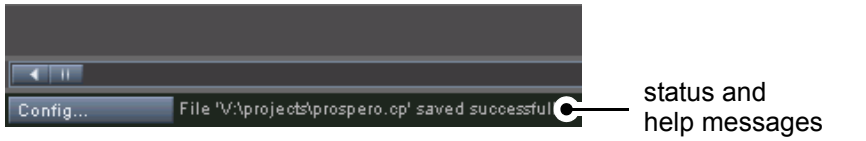


Figure 2-4: Status and help messages of the DVS software

As well, this part of the task bar will provide you with help information about the various menu options available via the menu bar of the DVS software. The help information will be displayed when you place the mouse cursor over one of the menu options.

2.4 Working with Prerendered Data

With the DVS system you can perform most operations in real time. When playing out, the workstation is capable of handling two data streams of 2K material for transitions in real time.

However, Fuze may not be able to handle all types of operators (e.g. transitions) or clips in real time. In such a case the DVS system offers you the possibility to prerender the material and/or operators prior to a play-out.

When working with prerendered files, additional data (image files) will be created on your main storage. It is recommended to store these project specific for each project separately. For further information about this please refer to section "Notes on Project Management" on page 2-11.

You can set the storage location of such files for each project differently via the Configuration Tool on the tab **Project** (group **Project**, field **Path for proxy data**; see "Fuze Configurations" user guide).

Prerendering generates proxies from clips and operators in the timeline that are not real-time capable. A prerendering means that the Edit Tool calculates the respective clips and operators (e.g. transitions) before a play-out takes place and stores the calculated extra files (rendered images) in a location for temporary data on the main storage. These proxies are then used for a play-out instead of the original material in the timeline.

For example, when using a type of clip that exceeds the real-time capability of your DVS system, it will be marked visibly in the timeline. In order to play it out in real time you will have to prerender it beforehand and it will be rendered in the format that is currently set as the video output format. The prerendered proxies carry project specific file names and are generated and administered by the Edit Tool automatically. The links to prerendered proxies will be stored in the project file, and when opening the project later again, it will not be necessary to render them anew.

When working with prerendered data you may get proxies on the storage that are no longer required for your current project but occupying disk space. This will happen, for example, as soon as a timeline element was prerendered and afterwards deleted or changed. Even a switching of the video format will make the already prerendered data obsolete due to the fact that the extra images may no longer coincide with the newly selected format. Because the software can never be sure when proxies are truly obsolete for a project, they will remain on the storage of your system. Nevertheless, to delete prerendered data you can use

the menu option ***Delete prerendering*** on the context menu of a video clip (see section “The Context Menu of Video Clips” on page 6-55).

To recognize the prerendered data belonging to one project easily it is recommended to store them project specific for each project separately. For further information about this please refer to section “Notes on Project Management” on page 2-11.

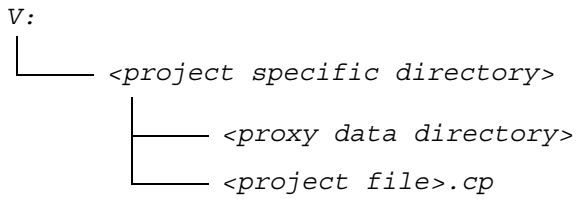
Related to a prerendering of timeline elements are the ***Prerender all*** menu option on the menu ***Project*** (see section “Prerender all” on page 8-11) and the section “Real-time Capability of Clips” on page 4-13, section “Jobs” on page 4-29 and section “Prerendering of Timeline Elements” on page 6-41.

2.5 Notes on Project Management

To enable a real-time play-out of certain clips and operators (e.g. transitions) the DVS system may create extra files to enable a play-out (prerendering).

For further information about prerendered data see section “Working with Prerendered Data” on page 2-9.

The location where these extra files are stored is saved project specific in the project file, i.e. each project file can have a different directory for proxy data and the exact location will be stored in the project file. Therefore, it is suggested when working with prerendered material, to store the project’s data in a directory of its own. DVS recommends, when working with different projects, to create for each project a project specific directory on your main storage where to save the project file. Beneath it create a subdirectory for the additional data:



This structure guarantees a clear and easy to manage project.

You can set the storage location of such data for the currently loaded project with the Configuration Tool of the DVS software in the group **Project** of the tab **Project** (see “Fuze Configurations” user guide as well as section “Working with Prerendered Data” on page 2-9 for more information).

2.6 Notes on Source Timecode and Keycode

Some file formats for clips, e.g. *.dpx files, are capable of storing more information than just their image content. These information are usually written in a specified format into the file headers which can be read and interpreted by different software applications that support these kind of information. Among the information stored you can find, for example, the name of the creator (usually the program that created the files), the creation time and date, the timecode and/or the keycode.

Most of the data stored in file headers and transmitted to the DVS software during a capturing will only be recorded and given back again during a play-out, if appropriate. However, DVS especially makes use of the timecode and keycode information.

The DVS software supports additional information such as source timecode in the *.dpx, *.mov as well as *.mxf and Broadcast Wave file formats. However, some features (e.g. multiple timecodes or the editing of header data) are available for *.dpx files only.

With the help of Spycer the header data, such as timecode or keycode information, can be adjusted to your liking (see "Spycer" user guide for more information).

2.6.1 About Source Timecode

Timecode information stored in file headers (the so-called source timecode) can be used in the whole DVS software. For example, you can use source timecodes in the timeline of the Edit Tool and regardless of their position in the timeline the respective clips will always show and use their source timecode. Then, prior to a play-out you can decide whether the internal timeline timecode should be given out as a timecode signal or the source timecodes provided by the files.

Regarding source timecode there are some peculiarities how the DVS software deals with source timecodes. Some of them are detailed in the following:

Normally, image files capable of storing timecode information provide space for one timecode only in their header (generic source timecode). DVS systems, however, are able to receive (e.g. during a record) several timecodes incorporated in signals at various connectors. During a write procedure, i.e. when recording clips via the I/O Tool (*.dpx files), they will write the received timecode information into the file headers. The ones additionally received will be stored at a location for user defined data in the header and usually cannot be interpreted by applications other than the ones developed by DVS. When processing such clips afterwards, for instance, in the timeline of the Edit Tool or when conform-

ing, you can select between the various timecodes provided by the clips which may give you more control over their position in the timeline.

Audio files equipped with source timecode usually provide a start timecode only. Subsequent timecodes will be calculated and drop-frame timecodes are currently not supported.

In the Configuration Tool of the DVS software you can configure the general way the software should deal with timeline and source timecode (see "Fuze Configurations" user guide). Here you can set in the respective group the type of source timecode that the DVS software will use as the default source timecode. Additionally, you can specify which timecode should be given out when performing a play-out.

Furthermore, throughout the DVS software individual clips may use different source timecodes which is a setting that can be adjusted in the clip's properties (see section "Changing the Properties of Clips" on page 4-21). The type of source timecode used by each clip can be changed even when the clip is already used in the timeline of the Edit Tool. And when clips do not provide a source timecode of their own, you can set the clips to show a virtual source timecode. The DVS software will then use the timecode specified as the source timecode offset as the virtual source timecode.

2.6.2 About Keycode

Keycode information stored in file headers can be used in the DVS software as well. When available in the file headers, they will be given back during play-out.

Keycode has its origin in the film world and is a variation of timecode to identify frames on a film roll. It is a machine-readable code printed at certain intervals along the edge of the camera negative film outside the perforations. Besides containing data, for instance, about the film type, the name of the manufacturer and the film stock, it is used to number individual images, i.e. it provides a reference number (`<count>+<offset>`) for the image where the keycode is written. The numbering available via keycodes can be used, for example, to match the film with a particular position of a data list (e.g EDL or cut list).

In the DVS software the keycode format normally is:
`<manufacturer ID and film type><6-digit film roll ID> <count>+<offset>.`

Example: `KK217312 5235+04`

2.7 About Timecode / Frame Number Fields

The DVS software provides various fields where data in timecode format is provided or an entry in such a format is necessary. The timecode format is `hh:mm:ss:ff` (hours, minutes, seconds, and frame number).

If `--:--:--:--` or `---` is displayed in an entry field, a value has not been specified so far.

Drop-frame Timecode Indication

The last colon of the timecode format may be displayed in the software as a full stop. Then the timecode fields of the software will display, for example, `12:25.07` instead of `12:25:07`. This indicates that the drop-frame timecode feature is activated. When entering timecode, the last colon can also be replaced by a full stop. Further information about drop-frame timecode can be found in the "Fuze Configurations" user guide.

Higher Frequencies and Timecode Format

In the user interface of the DVS software an asterisk may be added to the timecodes (e.g. `12:25:07*`). This will be the case when the video raster's frequency exceeds 30 frames per second because the original timecode format is limited to frame rates as high as that. To account for video rasters with higher frequencies (e.g. 720p at 60 Hz) one timecode number is used for several video frames, meaning every second, third or fourth timecode provides the same timecode number (the frames notation (see below) is not affected). These repeated timecodes are shown in the user interface with an added asterisk and at the outputs they are particularly flagged as well. The standard timecodes that will be used for such procedures are 24 Hz, 25 Hz and 30 Hz: For example, a video raster frequency of 48 Hz is provided with a 24 Hz timecode, while a 60 Hz frequency receives a 30 Hz timecode. This will result in a doubling of the timecode numbers:

60 Hz @ 30 Hz TC	60 Hz
...00:00	...00:00
...00:00*	...00:01
...00:01	...00:02
...00:01*	...00:03
...	
...00:29	...00:58
...00:29*	...00:59

60 Hz @ 30 Hz TC	60 Hz
...01:00	...01:00
...01:00*	...01:01

At even higher frame rates (e.g. 90 Hz) the timecode numbers will be tripled, quadrupled etc., making a timecode handling of all common frequencies possible.

Entering Timecode

When entering timecode in one of the software's position or length indicators, you may omit digits: if you enter less information, the entered timecode will be interpreted from right to left (the last number is the frame, the next the seconds, etc.). Every digit omitted between the colons is assumed to be a leading zero.

You may also omit the separators (colons). However, then you should observe that no digits are left out: With omitted separators the entered timecode will be interpreted from right to left (the last two numbers indicate the frame, the next two the seconds, etc.).

After pressing [Enter] on your keyboard the entered timecode is accepted in the respective timecode field, for example, to move to a certain position.

Examples:	`1:9`	jumps to 1 sec. frame 9 (`00:00:01:09`)
	`109`	jumps to 1 sec. frame 9 (`00:00:01:09`)
	`247`	jumps to 2 sec. frame 47 (`00:00:03:23` if raster is in 24p)

Additionally, in most position or length indicator fields you can enter a new value by either adding or subtracting the timecode or the frame amount from the given entry. For this simply add the timecode or frame amount with a minus or plus sign (-/+) to the given entry in the timecode/frame number field. After that press [Enter] to confirm your entry.

Examples:	`1:23+2:05`	jumps to 4 sec. frame 4 (`00:00:04:04` if raster is in 24p)
	`4:04-53`	jumps to 1 sec. frame 23 (`00:00:01:23` if raster is in 24p)

Switching the Notation

Scales (e.g. on timelines) and position and length indicators can be switched from a display of the timecode notation to frame numbers and vice versa. For this it is best to use the context menu of a timecode/frame number field (e.g. the position field of the timeline cursor, see section "Controls" on page 5-11).

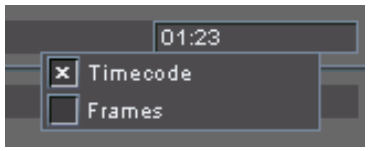


Figure 2-5: Context menu of a position field

Select from the context menu the respective menu option. This will change the position and length indicators of the respective software module to the selected notation.

A switching of the notation may effect the selected display type (internal frames/timecode will be used) and vice versa (see section "Changing the Display Type" on page 6-9).

Getting Started

This chapter provides you with some general information necessary to begin your work with the Edit Tool software module. First, the steps to start the DVS software and the Edit Tool will be explained. This is followed by a beginner's tutorial that shows you how to work with the Edit Tool: In a step-by-step description you will be instructed what to do to start your first project and how to perform some basic editing tasks.

More detailed information about individual items or steps described here can be found in the other chapters of this user guide

The chapter will be concluded with a description how to shut down the software.

3.1 Starting the Program

This section provides you with a description how to get the Edit Tool started.

To start the program you have to do the following:

- Select from the **START** button menu of Windows on the submenu ***DVS*** the entry for the DVS software (for example, ***All Programs » DVS » DVS Fuze***).
  Alternatively, you may also start the program via its icon on the desktop of Windows.

This will load the DVS software. As the starting user interface the Edit Tool will be started automatically.

Because the DVS software is designed to run in full-screen mode to provide for an undistracted view on the video material and the task at hand, the following shortcuts may be helpful:

- To open the Windows Explorer [Windows ( ) + E]
- To open the Task Manager [Ctrl + Alt + Del]
- To switch to the Windows desktop [Windows ( ) + D]
- To switch to another application [Alt + TAB]

To minimize the user interface, for example, to access other applications, you may also use the ***Minimize*** menu option of the program icon on the menu bar (see section “Minimize” on page 8-2).

Via the check box **Don’t show this message again** offered by information messages of the DVS software you can deactivate the appearance of this particular message for the current software session (i.e. next session it will be displayed again).

When starting the DVS software, a drop report is as a standard automatically written. Further information about the log files and the drop reports can be found in section “The Performance Monitor” on page 4-32.

3.2 First Steps in the Edit Tool

This section introduces in a step-by-step description how to work with the Edit Tool. It will be explained what to do to begin a project, how to work with the timeline and how to perform some basic editing tasks. Use this tutorial to familiarize yourself with the Edit Tool and the way it has to be handled.

3.2.1 Preparing the Bin

After starting the DVS software the Edit Tool will be started automatically. At the upper left side of the program window you can see the tool area with the bin activated by default.

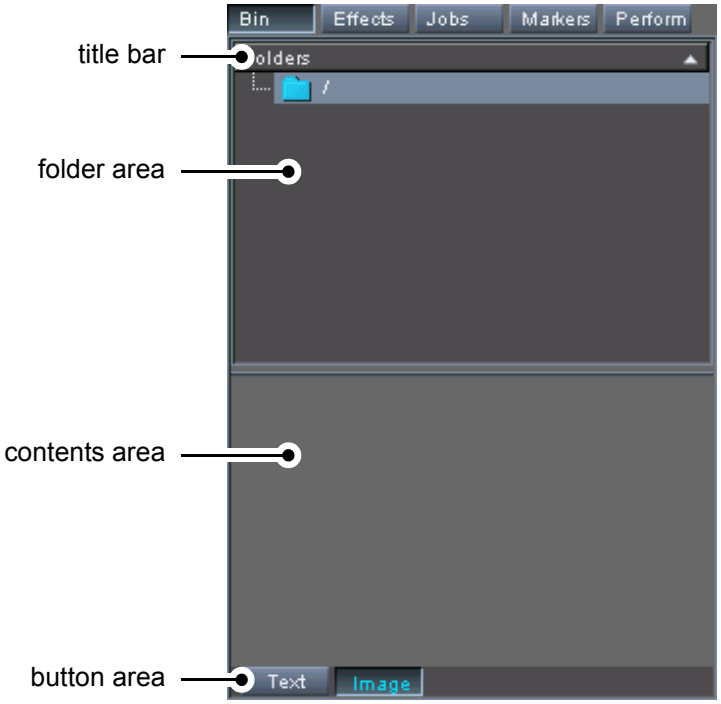


Figure 3-1: The bin activated in tool area

The bin provides initial access to the video/audio material stored on your system. In the bin you can find two main areas: In the folder area you can make folders and directories to sort your material into. This way, you can perform a clip and project management. In the contents area you can preview the material sorted into a folder via thumbnails or text information. The thumbnails also provide a scrub bar to set roughly the inpoint of the respective clip.

You can configure the appearance of the bin freely. It will be saved together with the project file:

– You can arrange the areas horizontally if you like (select the respective appearance from the context menu of the bin's title bar).
– Via the buttons in the button area you can set whether the clips shall be seen as thumbnails with text or with their text information only.
– The kind of text information displayed in the bin can be set freely with the Configuration Tool (button **CONFIG...** or ***Options » Configuration project...***).

Furthermore, the right edge of the tool area can be moved, for example, to display the contents of the activated tool completely. Then, in case of the bin, you will be able to view the thumbnails together with all text information available. If you pull the right edge of the tool area completely to the left, the tool area will no longer be visible; if you pull it completely to the right, the control area will be hidden and the contents of the activated tool will be displayed in full.

To prepare the bin for a project you have to fill it with audio and/or video material first. There are several ways to do this: The best and most informative way is to use Spycer (see section "Adding Clips to the Bin Using Spycer" on page 4-9), but they can also be added by using a file manager, which is more appropriate when using the Edit Tool for the first time:

The DVS software works with standard computer files. Video and audio data should be stored on the designated storage only (e.g. the system's main storage or a DVS-SAN). Other storage locations may be too slow for real-time operations. Furthermore, it is strongly recommended to use the main storage for video and audio as well as project related data only. Save other data on the system disks.

- Open a Windows file manager, for example, the Windows Explorer with the keyboard combination [Windows ( ) + E].
- In the file manager select a video file (either a file within a directory or the directory itself) on the storage where the video data is stored.

  For a list of the supported file formats see section "Supported File Formats" on page A-9.
- Drag and drop the selected video file/directory to the contents area of the bin with the help of the mouse:

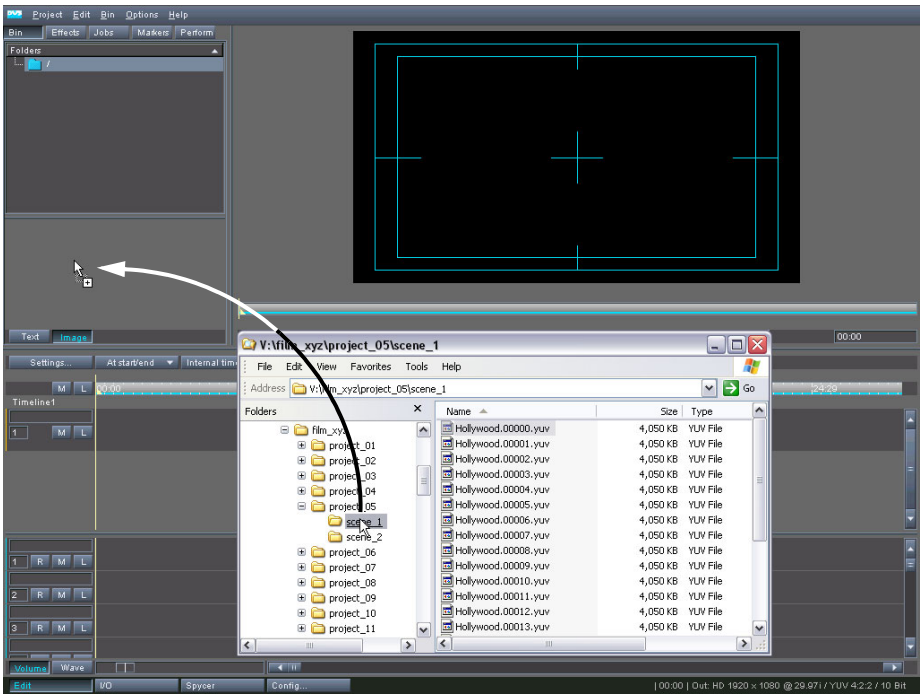


Figure 3-2: Drag and drop of clip to bin

The respective video data will then be made available to the DVS software and you will receive a thumbnail of the material in the contents area of the bin. When the thumbnail is selected, it provides the following features:

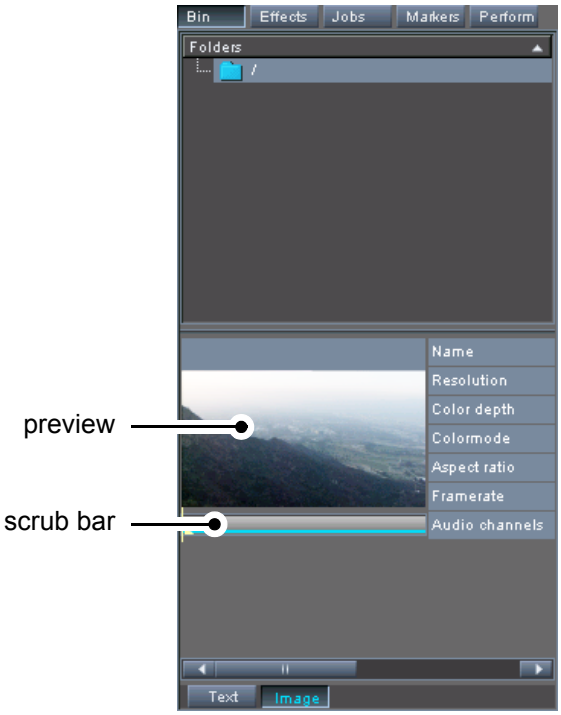


Figure 3-3: Selected clip in contents area of bin

- Add another, different clip to the bin by performing the drag-and-drop procedure again.

The new clip is added to the clip list of the bin as well. Now two clips are available in the Edit Tool and you can start working with them. With the scrub bar below the thumbnails (visible when a clip is selected) you can preview the material and roughly select an inpoint for the respective clip. However, for our demonstration here we will leave the clips' inpoints as they are.

When audio should be used in your project, you have to drag (add) audio clips to the bin as well.

If you select another file than the first frame file in a video directory, the scrub bar cursor of the thumbnail (the clip's inpoint) will be set accordingly.

You may select more than one video directory in the file manager and drag them to the contents area of the bin. The respective clips will all be added to the bin.

You can also add clips to the bin by using the menu option ***Add clip...*** on the context menu of the contents area or the menu ***Project » Add clip...***.

Via the context menu of a clip in the bin (either audio or video) you can call up the clip's properties. Most of these can only be altered if the clip is not already present in the timeline.

When adding clips to the bin with a procedure other than a record, some properties may not be discerned properly due to missing file header information. Then they will either be deduced from the file format, color space, etc. of the clip, or configured to the currently set timeline output settings. If the properties of the clip do not match the material on the storage, you have to change them accordingly (see section "Changing the Properties of Clips" on page 4-21).

3.2.2 Adding Clips to the Timeline

For the editing process the Edit Tool uses a timeline with several video and audio tracks where you can add the clips in the desired sequence as they should be played out in the end. You can then, for instance, define wipes, dissolves or cuts for the material. There is no need to worry about your original material being in different resolutions, bit depths,

color spaces, or file formats: The DVS system works format independent and is capable of handling material up to 4K.

To view your project on an additionally connected monitor, you have to configure the output format of the timeline accordingly. The setting of the output format (video raster) of the project can be configured with the button **SETTINGS...** at the top left side of the timeline area.

To begin an editing work you have to drag the clips to the timeline of the Edit Tool first:

During all works with the DVS software your original material will never be altered. The clips in the software are only representations of the original material on the storage. All editing tasks are performed virtually.

- Select a clip (clip A) in the contents area of the bin and drag and drop it to the beginning of the video track:

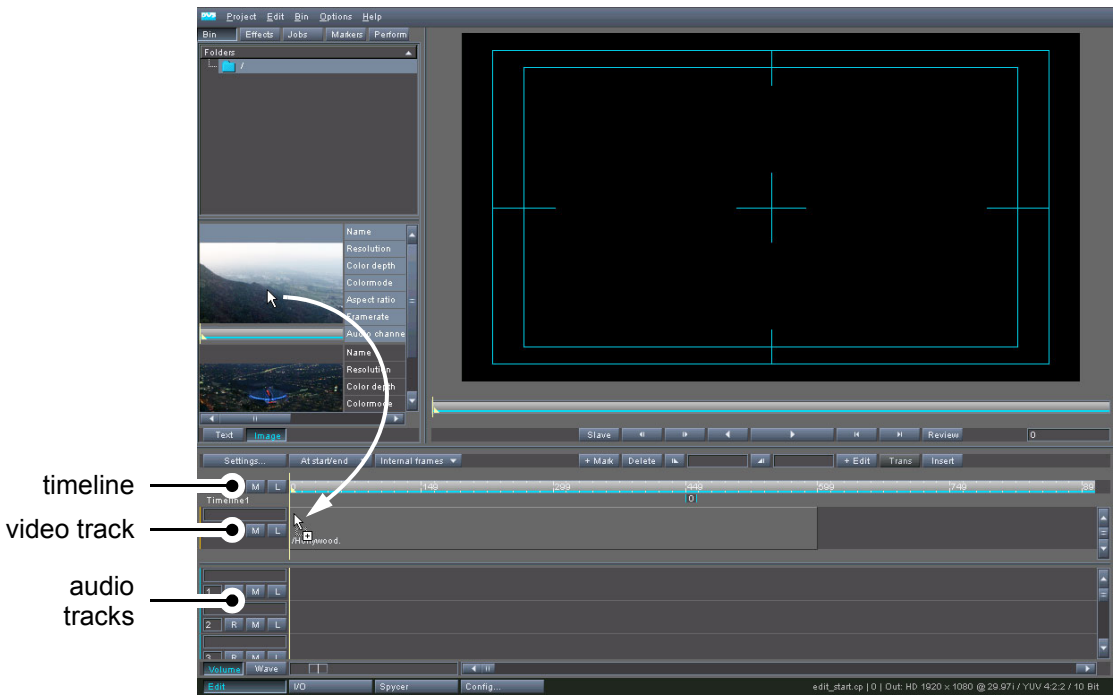


Figure 3-4: Drag and drop of clip to timeline

Once the mouse button is released, a representation of the clip (clip A) is added to the timeline. However, its counterpart in the bin is neither removed nor deleted. It will remain there for future use so that you can add the clip (or other parts of it) to the timeline again.

The video clip will be placed at the position of the mouse pointer where the mouse button is released. However, when the mouse pointer reaches certain elements on the timeline, the added clip will automatically

align itself to these elements, in our example here to the beginning of the timeline. This behavior is called the snapping mode of the Edit Tool.

The snapping mode is a very useful feature if you want to position clips in the timeline. It reacts not only to the starting point of the timeline but also to the in- and outpoint of clips, the position of the timeline cursor or the set in- and outpoint of the timeline. You can disable the snapping mode and activate a fine tuning mode by pressing the [Shift] key.

While the starting point of the clip (its position and inpoint) within the timeline is set during the drag-and-drop procedure, its outpoint is usually defined by the length of the clip. However, all these attributes can be changed easily after clips were added to the timeline, their position within the timeline as well as their in- and outpoints.

After adding a clip to the timeline, a gap may appear (part of the timeline without contents). Gaps can be indicated by a red line in the timeline scale. If this occurs, you can move the clip easily to the beginning of the timeline with a double-click of the mouse on the timeline scale (see section "Moving Clips within the Timeline" on page 6-34).

- Now add the second clip of the bin to the timeline (clip B).

If clip B is dropped in the middle of clip A in the video track, clip A will be divided and the rest of it will move to the end of the timeline.

This behavior can be changed via the button **INSERT**. This button switches between the insert and the overwrite mode of the Edit Tool. In the overwrite mode the rest of the clip (or at least the contents of clip A with the length of clip B) would be overwritten.

For the rest of this tutorial we suppose that this has happened and that clip A is divided into two by inserting clip B in the middle of it.

Audio clips can be dragged from the bin to the audio tracks of the timeline area. If the audio clips incorporate more than one mono or stereo channel, the additional channels will be added to the other audio tracks below the selected one.

3.2.3 Changing the View of the Timeline

Via the sliders below the audio tracks in the timeline area you can change the view of the tracks:

Figure 3-5: Timeline sliders

With the left slider you can zoom in or out of the timeline (keyboard shortcuts [Up Arrow] and [Down Arrow]). If the slider is set to the left-most point, you are able to see the whole contents of the timeline. When it is set more to the right, you will zoom into the timeline.

When you have zoomed into the timeline, you can change the viewing position of the timeline with the right slider. You can go to the end of the timeline by pulling this slider to the right, and to the beginning of the timeline by pulling it to the left.

Via the Configuration Tool (button **CONFIG...** or ***Options » Configuration defaults...***, group **General**) you can set the way the Edit Tool performs a zooming on the timeline. There you can set whether zooming should occur on the position of the timeline cursor or on the current viewing position of the timeline.

For our example project we aim at having only two clips in the video track. For this it is best to view the complete contents of the timeline:

- If appropriate, use the sliders below the audio tracks in the timeline area to zoom out of your project: Move the left slider to the left until you see the complete timeline.

When you have changed the view of the timeline, you will see a screen like the following:

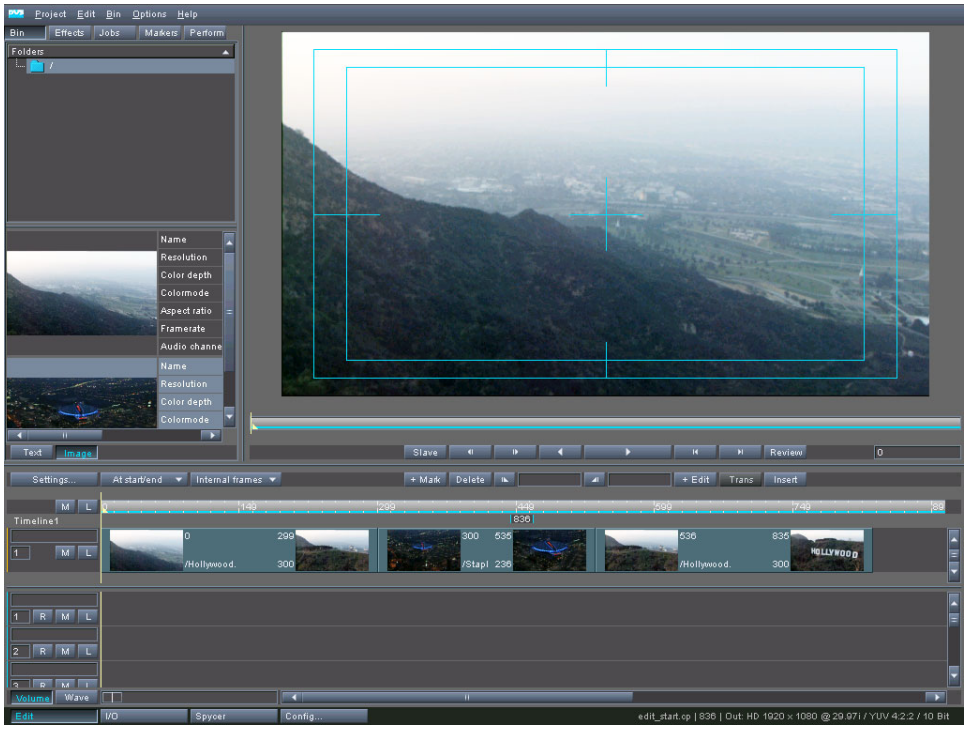


Figure 3-6: Project in timeline

The buttons right in front of the timeline tracks (video as well as audio) determine whether a track is muted (barred from an output, button **M**) or locked (barred from editing, button **L**).

With the button **SETTINGS...** at the top left side of the timeline area you can determine the output format (video raster) of the project. Here you can also configure the size of the video and/or audio tracks. There is also a setting available that performs an autoscaling of the material in the timeline if the resolution differs from the configured output raster.

As a next step we want to delete one of the clips from the timeline and change the sequence of the remaining clips.

3.2.4 Moving Clips in the Timeline

Because for this tutorial we want to have only two clips in the video track, clip B and clip A (in this particular order), we have to delete the second part of clip A and then change the sequence of the remaining two clips. For this perform the steps as described below:

- Select the second part of clip A (the last clip present in the timeline) with a click of the mouse and delete it with the keyboard key [Del].

The representation of the clip in the timeline will be deleted and you will see two remaining clips in the video track of the timeline:

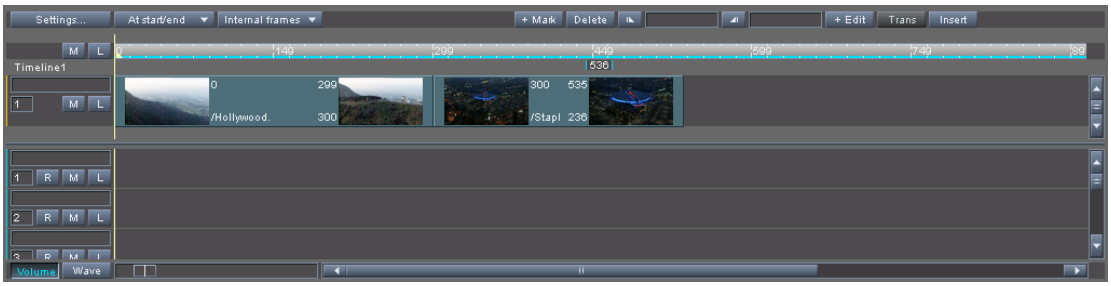


Figure 3-7: Clip A and clip B in timeline

Now we want to change the sequence of the remaining two clips:

- Select clip B (second clip in the timeline) with the mouse and drag it along the timeline to the beginning of the timeline:

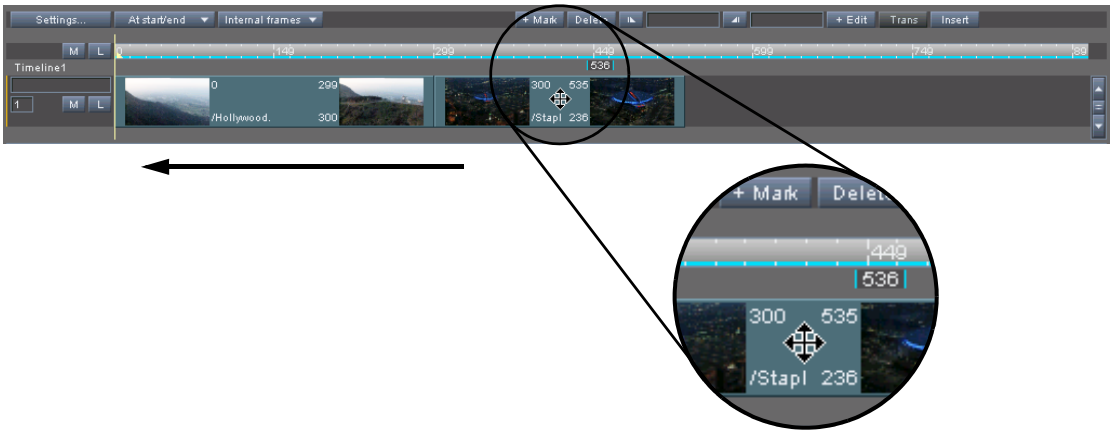


Figure 3-8: Changing the position of the clip

When the dragged clip reaches certain elements on the timeline, it will automatically align itself to these elements (snapping mode, see section "Adding Clips to the Timeline" on page 3-6).

- Once the dragged clip reaches the beginning of the timeline, release and drop it.

With the Edit Tool in the insert mode the rest of the video material will move backwards in the timeline as soon as the clip is dropped.

After changing the sequence of the clips this tutorial goes on with a description how to change in- and outpoints of clips in the timeline.

3.2.5 Manipulating In- and Outpoints in the Timeline

Clip A (now the second clip in the timeline) was cut during the adding of clip B to the timeline. Thus it already provides a trimmed outpoint. However, clip B (now the first clip in the timeline) was added with its full length. If a transition should be set between these two clips, at least one of their in- and outpoint has to be trimmed, either the outpoint of clip B or the inpoint of clip A. To demonstrate how to add a transition between the two clips, we now want to change the outpoint of clip B in the timeline:

- Select the end of clip B (first clip in timeline) and move it to the left to trim its outpoint (tail).

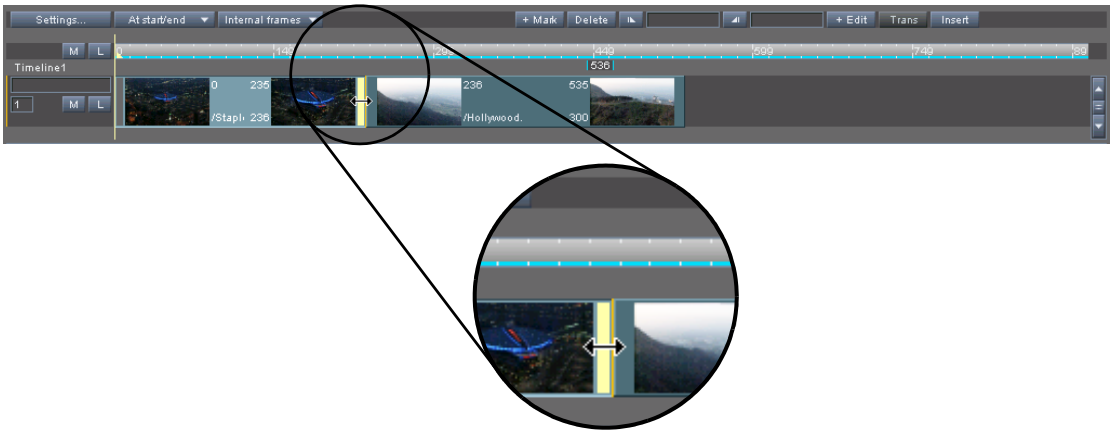


Figure 3-9: Changing of outpoint

As long as the insert mode of the Edit Tool is active, clip A will automatically adjust its position on the timeline respectively.

While trimming the outpoint you will notice a blue line above the selected clip:

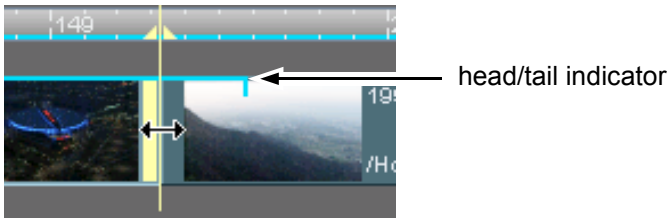


Figure 3-10: Display of original length of clip

This line shows the original length of the clip. You can use it to determine easily how much tail is available to, for example, create a transition.

- Once sufficient tail is available, release the outpoint handler and drop it.

With this you have manipulated the outpoint of the clip. The same way you can, of course, change inpoints as well.

You cannot change the in- and outpoint of a clip beyond the limits of its original material on the storage indicated by the head/tail indicator.

Clips in the timeline can also be trimmed by cutting them with the button **+ EDIT** and afterwards deleting the not required part of the clip. The cut will be applied to the position of the timeline cursor. If a track is locked, no cutting will be performed.

Next, we want to add a transition to the cut between clip B and clip A on the timeline.

3.2.6 Adding a Transition to the Timeline

Once at least two clips are present in the video track of the timeline, you can add a transition between the clips. In our example we want to apply a transition to the cutting point between clip B and clip A. For this perform the following:

- Via the controls ( ) or the keyboard shortcuts [S] (jump forward) and [A] (jump backward) you can move the timeline cursor to cutting points on the timeline. Use the respective button or key to go to the cutting point between the clips:

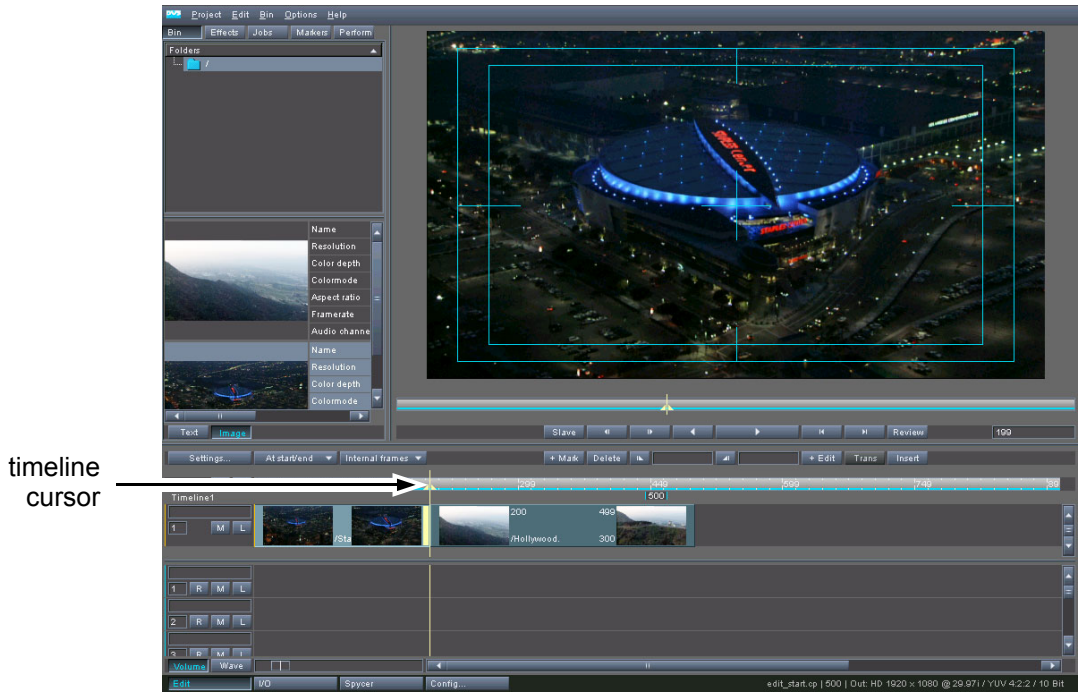


Figure 3-11: Timeline cursor at cutting point

This will make the button **TRANS** available in the user interface.

- Select the button **TRANS**.

A transition appears between the two clips:

Figure 3-12: Transition in timeline

With the transition available between the two clips you can now call its properties, for example, to change the type of wipe for the transition:

- With the mouse double-click the transition in the timeline.

The properties will be shown instead of the visible audio tracks right below the timeline area (see section “Properties of a Transition” on page 7-7).

- With the properties of the transition available select as a transition type, for example, `Vertical Wipe` from the list box.

To the left of the properties area you can also set the duration of the transition frame accurately. Simply type in the duration and confirm it with the [Enter] key.

This will apply the selected transition type to the transition between the two clips. You may now use the controls of the Edit Tool to review its outcome.

In the insert mode there must be enough head and/or tail available of at least one clip to set a transition, otherwise the button **TRANS** will be unavailable. If you are in the overwrite mode of the timeline, the Edit Tool will create the head and tail necessary for the transition automatically.

You can delete a transition the same way you delete a clip from the timeline. Simply select the transition and press the key [Del] on your keyboard.

With this step our example project is now complete and you can, for example, perform additional works on the timeline or play it out in the selected output format (button **SETTINGS...**).

3.3 Exiting the Program

To end the current software session perform the following:

There is no way to end the Edit Tool alone. When you exit the Edit Tool, the whole DVS software will shut down. Therefore, it is recommended to finish all tasks, such as a play-out operation, beforehand. Otherwise the respective task may get interrupted.

- Select the option ***Exit*** on the ***Project*** menu or press the key combination [Alt + F4] alternatively.

You may also use the menu option ***Exit*** of the program icon on the menu bar of the user interface (see section “Exit” on page 8-2).

The DVS software will be closed and you can then, for instance, shut down the system.

When exiting the program, a DVS information file is as a standard automatically written. Further information about the log files and the DVS information file can be found in section “The Performance Monitor” on page 4-32.

The Tool Area

On the left side of the user interface directly below the menu bar you can find the tool area. It shows you depending on the optional features available or the currently activated software module as well as task mode various tools that can be used during your work. The different tools are provided as tabs to switch easily between them.

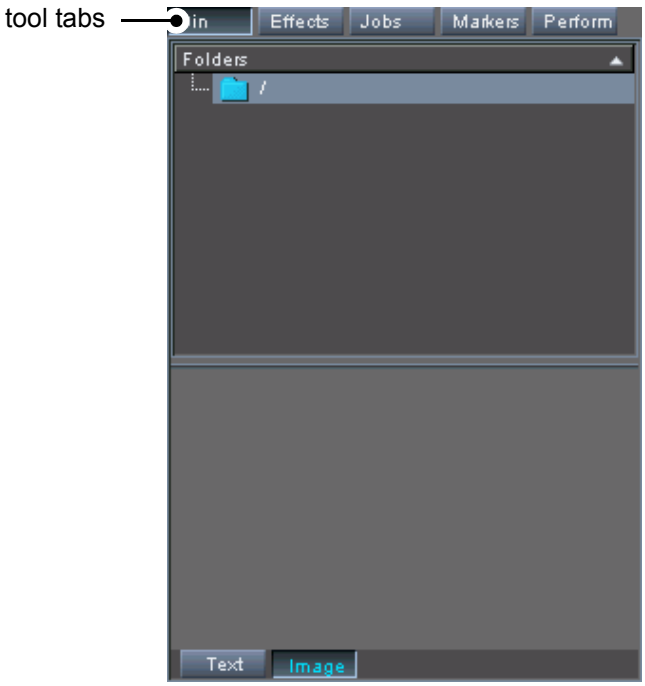


Figure 4-1: The tool area

When you activate one of the inactive tool tabs, the tool area will change its appearance and the respective tool will be displayed in the tool area. Among the tools you can find, for example, the bin which provides initial access to the video material stored on your system, or the performance monitor to assess the real-time operation of the DVS system, for example, during a play-out of the timeline.

This chapter describes the features of the tool area as well as the default tools available in the Edit Tool module in detail. These default tools may also be available in the other software modules of the DVS software.

4.1 Changing the Size of the Tool Area

Some tools may not be shown in full, i.e. with all items or information displayed in the currently visible area of the tool area. To get a better view on the individual tools or make items visible that are otherwise hidden you can change the size of the tool area.

For this perform the following:

- Move the outer right edge of the tool area to the left or to the right with the mouse.

Then you will be able to view, for example, the thumbnails of clips present in the bin together with all their text information.

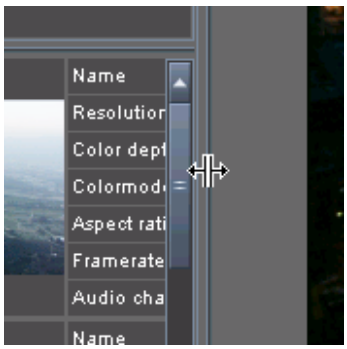


Figure 4-2: Adjusting the size of the tool area horizontally

If you pull the right edge completely to the left, the tool area will no longer be visible and thus can be turned off. If you pull the right edge completely to the right, the control area will be hidden and you can see horizontally the contents of the respective tool in full.

Additionally, you can alter the size of the tool area vertically:

- Move the lower edge of the tool and control area which is also the upper edge of the timeline area up or down with the mouse to enlarge or reduce the areas.

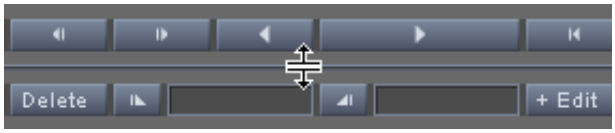


Figure 4-3: Adjusting the size of the tool area vertically

The vertical size of the tool and control area will adjust itself automatically which will also affect the size of the timeline area (see section "Changing the Layout of the Timeline Area" on page 6-5 for further information).

4.2 The Bin

After starting the DVS software and thus the Edit Tool the bin is by default activated in the tool area.

If the bin is not displayed in the tool area of the Edit Tool select the tab **Bin** to activate it.

Then the area will look similar to the following figure:

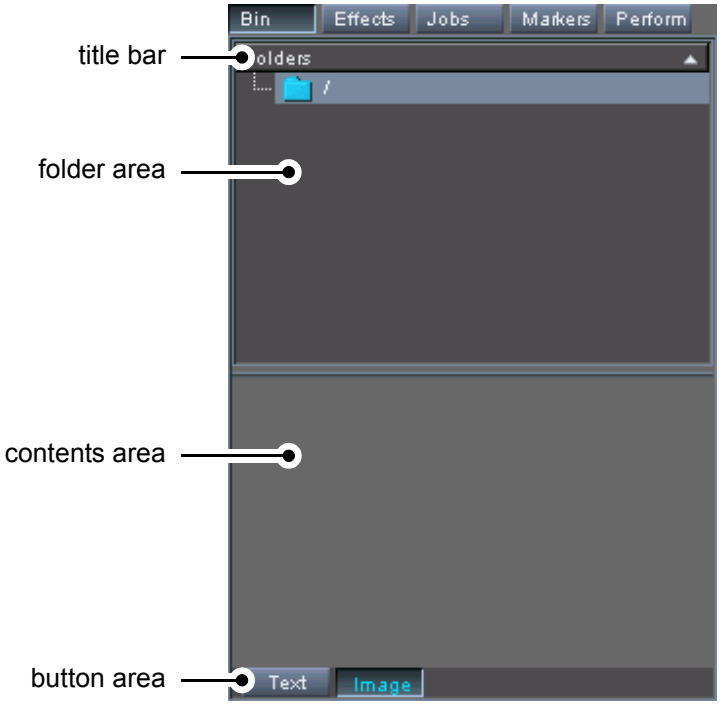


Figure 4-4: The bin

With the bin you can perform a clip and project management by creating folders and sorting your video and audio material into them. Furthermore, you can preview your material via thumbnails and select a preliminary inpoint for the respective clip.

For this the bin provides the following elements:

Most areas or items of the bin provide a context menu to make the various functions of the bin available to the user.

title bar	With the title bar you can change the layout of the bin or sort your created folders present in the folder area.
folder area	In the folder area you can create folders to sort and structure your video and audio material. This way you can perform a clip and project management.

contents area	In the contents area you can see the video or audio material already added to the bin and sorted into the folders via their thumbnails or text information. If the thumbnail view is activated, a scrub bar to preview your material in still images and to set roughly the inpoint of the respective clip is provided by a clip once it is selected. You can administer the clips directly or add new clips to the bin with the help of the context menu of the contents area.
button area	The button area of the bin contains the view buttons that can be used to select whether the clips in the contents area shall be seen as thumbnails with text or with their text information only.

This section explains all features provided by the bin of the DVS software in detail.

4.2.1 Configuring the Bin

With the bin you can perform a clip and project management: You can structure the clips by sorting them to different folders and you can preview the clips as well as access additional information via their text display in the bin. To serve all these functions at once, you can change and configure the layout of the bin freely:

– The areas of the bin can be arranged horizontally or vertically.
– The appearance of clips in the contents area can be changed.

Both procedures are explained in this section.

Changing the Layout of the Bin

To provide, for example, for a better view on the material in the bin, the areas of the bin, the folder and the contents area, can be arranged horizontally or vertically via the title bar of the folder area. For this do the following:

• Call up the context menu of the bin's title bar (usually with a right-click of the mouse).

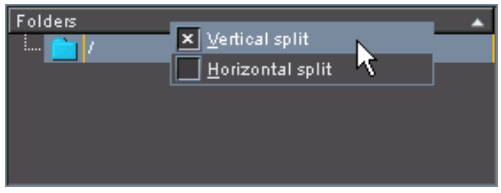


Figure 4-5: Context menu of title bar

- Select the horizontal or vertical appearance of the bin from the context menu.

The context menu to change the layout of the bin can also be called on the area where the view buttons are located.

The layout of the bin will be set accordingly.

Additionally, you may change the size of the tool area to get a better view on the bin or to make items visible that cannot be seen in the visible part of the tool area (see section “Changing the Size of the Tool Area” on page 4-2).

Changing the View of Clips

Via the view buttons at the bottom of the bin you can set whether the clips in the contents area shall be seen as thumbnails with text or with their text information only.

Use the button **TEXT** to view the clips in the contents area with their text information only:

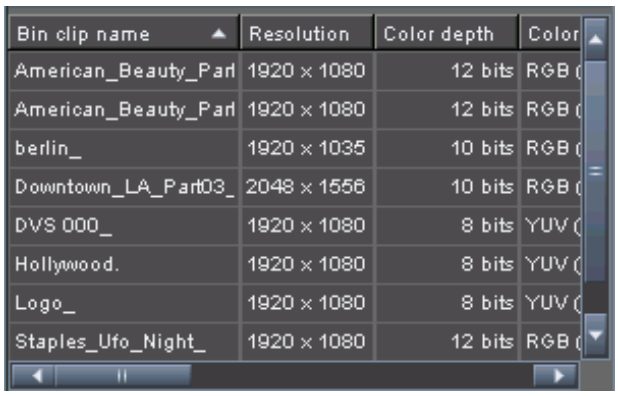


Figure 4-6: Contents area with text information

In this view you can easily alter the sequence of the columns to your requirements by dragging and dropping the column headings with the mouse.

Additionally, you can sort the clips in ascending or descending order by clicking on a column heading (see also section “Sorting Clips” on page 4-19). The sorting will also be available after switching to the thumbnail view of the bin again.

The kind of text information displayed can be set freely with the Configuration Tool (see “Fuze Configurations” user guide for more information).

With the button **IMAGE** you can activate the view of the thumbnails again.

For the thumbnail view of the contents area there are also text information available that can be set via the Configuration Tool as well (see above). These texts will then appear to the right of the thumbnail (as shown in figure 4-12 on page 4-17).

4.2.2 Adding Clips to the Bin

Before you can begin to work with clips in the Edit Tool you have to fill the bin with clips available on the system. There are several ways to fill the bin with clips of video and audio:

1. You can open a standard file manager (e.g. the Windows Explorer) and drag and drop the clips, either a file within a directory or the directory itself, to the contents area of the bin,
2. you can use the menu option ***Add clip...*** on the context menu of the bin's contents area or the menu option ***Add clip...*** of the ***Project*** menu to fill the bin with contents,
3. you can drag and drop contents to the bin with the help of Spycer, the content management software module, or
4. you can capture clips with the I/O Tool software module of the DVS software.

All these procedures will be explained in this section.

The DVS software works with standard computer files. Video and audio data should be stored on the designated storage only (e.g. the system's main storage or a DVS-SAN). Other storage locations may be too slow for real-time operations. Furthermore, it is strongly recommended to use the main storage for video and audio as well as project related data only. Save other data on the system disks.

When adding clips to the bin with a procedure other than a record, some properties may not be discerned properly due to missing file header information. Then they will either be deduced from the file format, color space, etc. of the clip, or configured to the currently set timeline output settings. If the properties of the clip do not match the material on the storage, you have to change them accordingly (see section "Changing the Properties of Clips" on page 4-21).

Adding Clips to the Bin with a File Manager

In the following it is described how to use a standard file manager of the operating system to move video or audio clips to the bin:

- Open a Windows file manager, for example, the Windows Explorer with the keyboard combination [Windows ( ) + E].
- In the file manager select an audio or video file (either a file within a directory or the directory itself) on the storage where the video data is stored.

  For a list of the supported file formats see section “Supported File Formats” on page A-9.

- Drag and drop the selected file/directory to the contents area of the bin with the help of the mouse.

  You can also drop the file/directory on a folder in the folder area of the bin (e.g. the root folder).

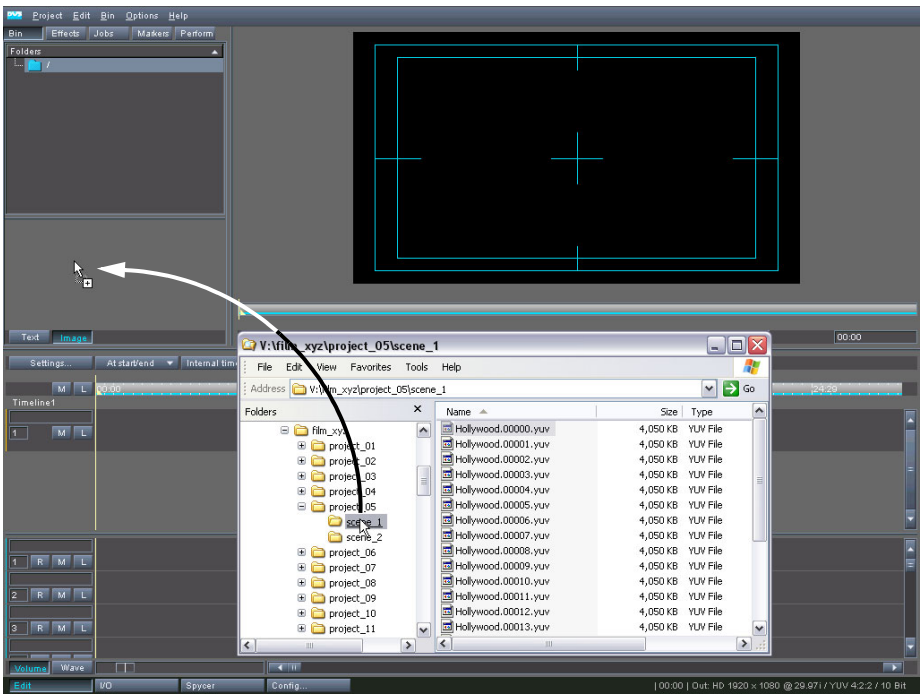


Figure 4-7: Drag and drop of clip to bin

You may select more than one directory (e.g. with the [Ctrl] key pressed) and drag them to the contents area of the bin. The respective clips will all be added to the bin.

With video, if you select another file than the first frame file in a video directory, the scrub bar cursor of the thumbnail (a possible clip's inpoint) will be set accordingly.

With this procedure folders in the folder area may be created automatically representing the directory structure on the storage. Then the clips will already be sorted into the respective folders. This behavior can be configured with the Configuration Tool of the DVS software (see the "Fuze Configurations" user guide).

Folders may also be created automatically if an audio clip is registered as a multi-clip. For more information about multi-clips see section "Details about Clips" on page 4-10.

The respective data will then be made available to the DVS software and you will see it in the contents area of the bin. By repeating the described steps above you can add as many clips to the bin as you need.

Once clips are available in the bin, you can start working with the Edit Tool and add them to the timeline (see section "Adding Clips to the Timeline" on page 6-2).

Adding Clips to the Bin Using the 'Add Clip' Menu Options

You can use the 'add clip' menu options to select video or audio clips that you want available in the bin.

For a list of the supported file formats see section "Supported File Formats" on page A-9.

- Either select the ***Add clip...*** menu option on the context menu of the bin's contents area or the menu option ***Add clip...*** on the menu ***Project*** (section "The 'Project' Menu" on page 8-3).

Both possibilities open a standard dialog window of the operating system for the selection of a file:

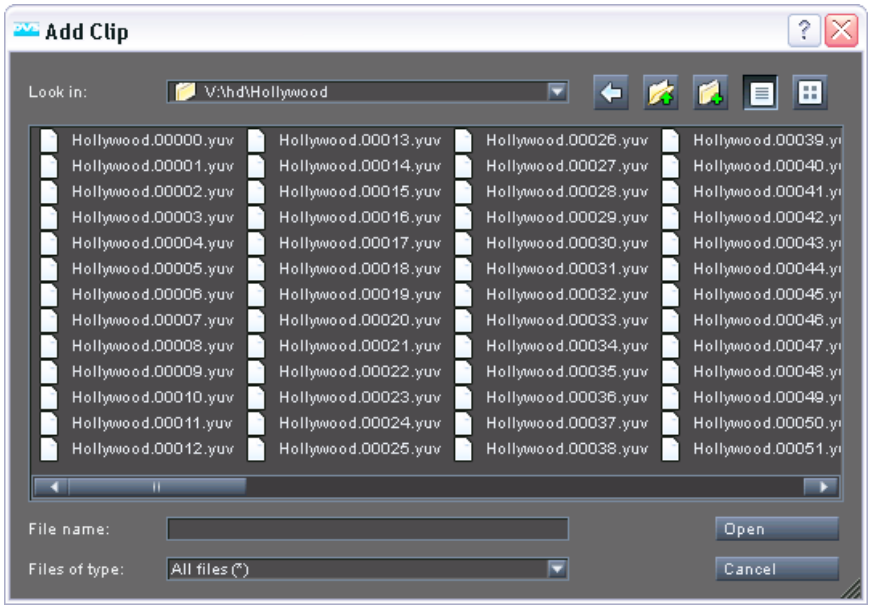


Figure 4-8: Dialog window to add a clip to the bin

- Select a video or audio file from the list box or enter its name in the entry field **File name**.

  If you select another file than the first video frame file in a video directory, the scrub bar cursor of the thumbnail (a possible clip's inpoint) will be set accordingly.

- Confirm your selection with the button **OPEN**.

The selected video or audio clip will then be added to the contents area of the bin. By repeating the described steps above you can add as many clips to your bin as your project needs.

Once clips are available in the bin, you can start working with the Edit Tool and add them to the timeline (see section "Adding Clips to the Timeline" on page 6-2).

Adding Clips to the Bin Using Spycer

To add clips to the contents area of the bin you can also use Spycer, the content management software integrated in the DVS software. It is the best and most informative way to add clips to the bin, because with Spycer you can, for instance, perform management tasks on the clip or preview it before adding it to your project.

Once the Spycer software module is activated with the button **SPYCER** in the task bar of the DVS software (see section "The Task Bar" on page 2-7), it shows two browsing panes where you can browse for data easily. Additionally you can see right below the menu bar the bin as it is available in the Edit Tool. When audio or video clips are displayed in the browsing panes of Spycer, they can be dragged and dropped to the contents area of the bin without any difficulty.

Further explanations of Spycer and its usage are not part of this user guide. You can find them in the "Spycer" user guide.

When the software module of Spycer is started for the first time, the initial setup of the application may be launched. In order to run Spycer you have to specify these (see the "Spycer" user guide for further details).

Adding Clips to the Bin via a Capturing

Clips can also be added to the bin by performing a capture operation with the optionally available I/O Tool of the DVS software. Once the record is finished, the recorded clip(s) will be available in the contents area of the bin.

Contrary to all previously described methods to add a clip to the bin, this procedure will set the properties of the clips correctly: No manual configuration of their properties will be necessary, for example, to correct their color space, field mode, etc. (see attention note in section "Adding Clips to the Bin" on page 4-6).

The exact procedure how to add clips to the bin via a capture operation is not described in this user guide. It is in detail explained in the "Fuze I/O Tool" user guide.

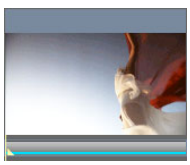
4.2.3 Details about Clips

During the adding of clips to the bin, the clips are checked for their type, length, resolution, bit depth, etc. If set accordingly, the text information of the clips in the bin will show you these information about the clips (see also section "Changing the View of Clips" on page 4-5). This section provides some details about clips in the DVS software.

The Clip Types

You can add video, audio and so called multi-clips to the contents area of the bin:

video clip:



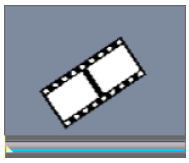
Video clips are seen in the contents area of the bin usually with their thumbnail previews. When a clip is selected, a scrub bar below the thumbnail will be available that can be used to preview the clip in still images and select an inpoint of the clip roughly (if enabled via the Configuration Tool).

audio clip:

To use audio in the Edit Tool you have to make the files available the same way as with video files: You have to add them to the bin as described in section “Adding Clips to the Bin” on page 4-6.

The DVS software supports audio clips that contain more than one mono or stereo channel (multiple channels) in the audio file. These clips will be available as one clip in the bin, but when added to the timeline, the additional channels will be added to the other audio tracks below the selected one.

invalid clip:



This icon indicates a video clip whose data is currently not available or an invalid clip. Then wait a few seconds and give the software time to gather the data. If after that the icon is still visible, you have to set the properties of this clip correctly via its context menu or provide the right video material on the storage to receive a valid clip in the bin.

multi-clips: Multi-clips are clips of either video or audio that are present in the bin as one clip but consist of several individual clips on the storage. Usually, these individual clips are stored in a subdirectory each, and all subdirectories are located under one main directory. When adding a multi-clip to the bin via a drag-and-drop procedure from a file manager (see section “Adding Clips to the Bin with a File Manager” on page 4-6), you may select the main directory as a clip and add it to the bin. All individual clips will then be available as one clip in the bin. Even when dragged to the timeline, the multi-clip is handled as one clip.

Multi-clips are a necessity due to file system limitations of the operating system, meaning Windows may cause problems if more than 20,000 files are stored in one directory. However, the DVS software will create multi-clips automatically, for example, during the finalizing of a project or when recording a clip with the I/O Tool. Then, when the clip exceeds a configurable number of frames in one directory, the DVS software divides the clip and saves it in as many subdirectories as needed under one main directory. Afterwards this main directory can be added to the bin as a multi-clip. To recognize multi-clips correctly a metadata file (*Sequence-Info.xml*) is created as well, detailing the number of files per folder for this clip. Further information about finalizing and the storing of a clip in subdirectories can be found in section "Finalizing the Timeline" on page 6-68.

When adding a main directory with one or more audio clips in subdirectories to the bin, it is checked whether they are multi-clips. If registered as such, a thumbnail for each multi-clip will be added to the contents area of the bin as described above. In addition, one or more subfolders will be created in the bin which will contain the individual clips used for the audio multi-clips. This behavior is useful because, contrary to video multi-clips, you cannot change the properties of an audio multi-clip via the context menu. If you want to change the properties of an audio multi-clip, you have to change them for each clip individually in its respective bin subfolder (see section "Changing the Properties of Clips" on page 4-21).

pending clip:

Clips of either audio or video that were not completely recorded, receive this icon. Then you will know that parts of this clip may be missing. However, you can already use them in the timeline of the Edit Tool and work with them.

unknown:

Files of an unknown type, i.e. files where the DVS software is not able to determine whether they are audio or video files, will get this icon. They cannot be used in the DVS software.

Real-time Capability of Clips

With an optimized system and a main storage that incorporates fully functioning hard disks, the DVS system can handle two data streams of film material up to 2K in RGB 12 bit in real time. If you want to process material of, for example, a higher bit depth, the real-time capability of the system cannot be ensured.

The real-time capability of the DVS system depends on various factors, such as frame size, play-out frequency, location of the clip on the storage, etc. When adding a clip to the bin, it will be checked whether its location and/or file format are real-time capable.

Additional checks will be performed when adding clips to the timeline. If any exceed the real-time capability of the DVS system, they will be subject to a prerendering (see section "Prerendering of Timeline Elements" on page 6-41).

Clips that may cause trouble because of their location and/or file format invoke a warning message when added to the bin. Then the clip will be visibly marked in the contents area of the bin: In the thumbnail view a warning icon will be superimposed on the thumbnail and the respective text information that is the cause for this warning will be colored in yellow:

This behavior, i.e. the warning message as well as the marking of a clip in the contents area of the bin, can be configured with the setting **Warn if base directory mismatch** (group **General**) in the Configuration Tool of the DVS software (see "Fuze Configurations" user guide for more details).

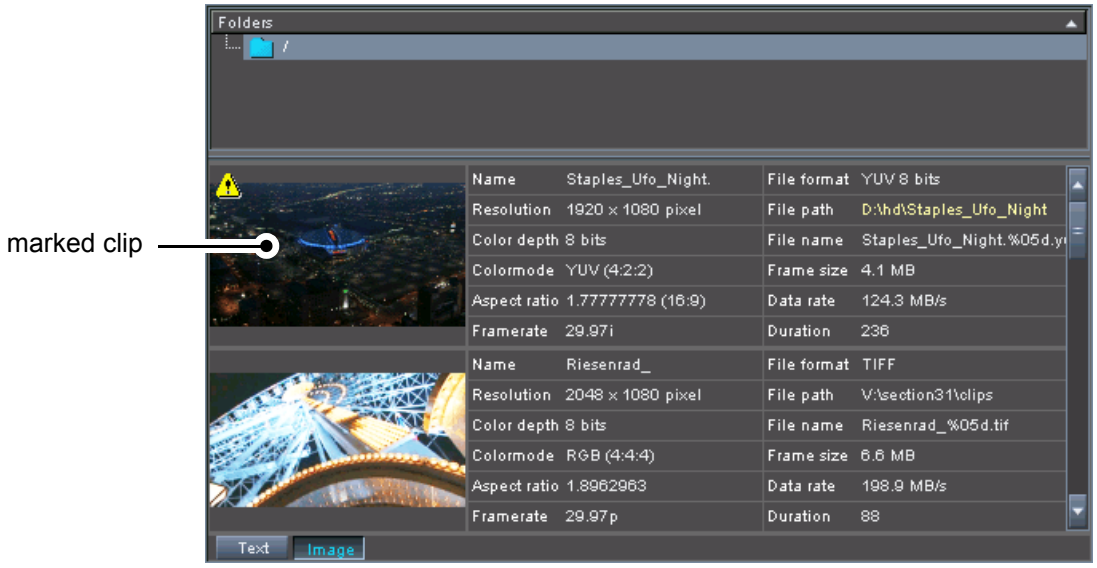


Figure 4-9: Clip marked in the bin

In the figure above the top clip is stored on a system drive. Because this location is not real-time capable (it may not provide enough data trans-

fer rate to make the vast amount of data accessible in time), a warning icon is visible at the top left side of the thumbnail and the respective value of the text information that is the cause for this warning is marked in yellow.

The location of the real-time capable storage is a configurable setting in the Configuration Tool of the DVS software (**System base video directory**, see "Fuze Configurations" user guide). This setting is also used during the exchange of project files between different DVS systems.

The **System base video directory** should always be configured to the native main storage (stripe set) of the DVS system (see "Fuze Configurations" user guide). Other storage locations may be too slow for real-time operations.

Via the setting **Additional real-time paths** of the Configuration Tool you can also configure other storage locations as real-time storages.

4.2.4 Working with Folders in the Bin

The folder area of the bin is used to create folders to sort and structure your video and audio material by sorting them to different folders. This way you can perform a clip and project management. In this section you can read what to do to create folders and how to administrate them.

For most of these tasks the context menu of the folders in the folder area is used. It provides different folder related functions, such as the creation of a new folder in the folder area or the renaming of an existent one.

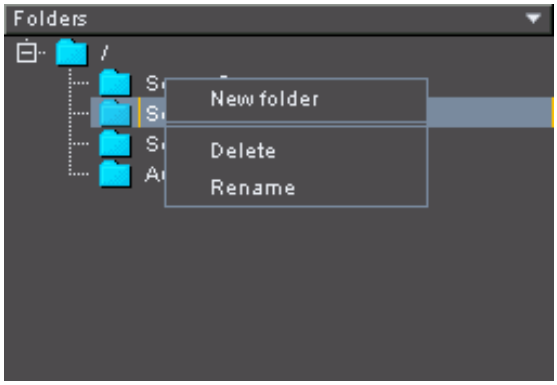


Figure 4-10: Context menu of a folder in the folder area

Creating Folders

Via the context menu you can create a new folder manually in the folder area of the bin:

- Call up the context menu on a folder in the folder area of the bin and select the menu option ***New folder***.

This will create a new folder in the folder area. It will be placed as a subfolder below the selected folder where the context menu was invoked. After this you have to assign a name to the newly created folder.

- Enter the name of the folder via the keyboard and confirm it with the [Enter] key.

Then the new folder will be present in the folder area of the bin and you can use it to sort your audio and/or video material into it (see section "Working with Clips in the Bin" on page 4-16).

Folders can also be created automatically with a drag-and-drop procedure from a file manager (see section "Adding Clips to the Bin with a File Manager" on page 4-6).

Sorting Folders

As soon as folders are available in the folder area of the bin, you can sort them in descending or ascending order. If your project contains a lot of folders in the bin, this will make it easier for you to find an individual folder. To sort the folders do the following:

- Simply click on the title bar with the mouse.

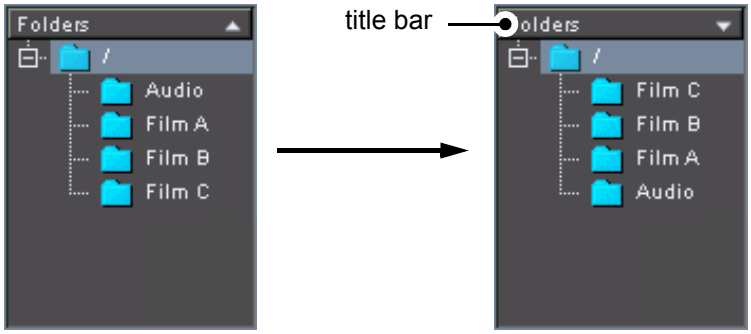


Figure 4-11: Sorting the folders

This switches between a descending and ascending order of the folders in the folder area. The type of order will be indicated by the triangle at the right-hand side of the title bar.

Renaming Folders

To rename folders and thus to give them a different name after they were created in the folder area of the bin perform the following:

- Call up the context menu on a formerly created folder in the folder area of the bin and select the menu option ***Rename***.

After this you can change the name of the respective folder:

- Enter the new name of the folder via the keyboard and confirm it with the [Enter] key.

Then the selected folder will be given the new name.

Only previously created folders can be renamed. The root folder cannot be changed in any respect.

Deleting Folders

Folders can be deleted the same way they are created, via the context menu:

- Call up the context menu on a formerly created folder in the folder area of the bin and select the menu option ***Delete***.

To delete a folder you may also select the folder and press the key [Del] on your keyboard.

After this a warning message will appear on the screen.

- If you want to delete the folder and all clips that are sorted into it, confirm the warning message.

This will delete the respective folder where the context menu was invoked. If clips were sorted into the selected folder, they will be deleted as well.

Only formerly created folders can be deleted. The root folder cannot be changed in any respect.

4.2.5 Working with Clips in the Bin

In the contents area of the bin you can see the video or audio material already added to the bin and sorted into the folders via their thumbnails and/or text information. If the thumbnail view is activated and a clip is selected in the contents area, a scrub bar to preview your material in still images and set roughly the inpoint of the respective clip is provided by each thumbnail.

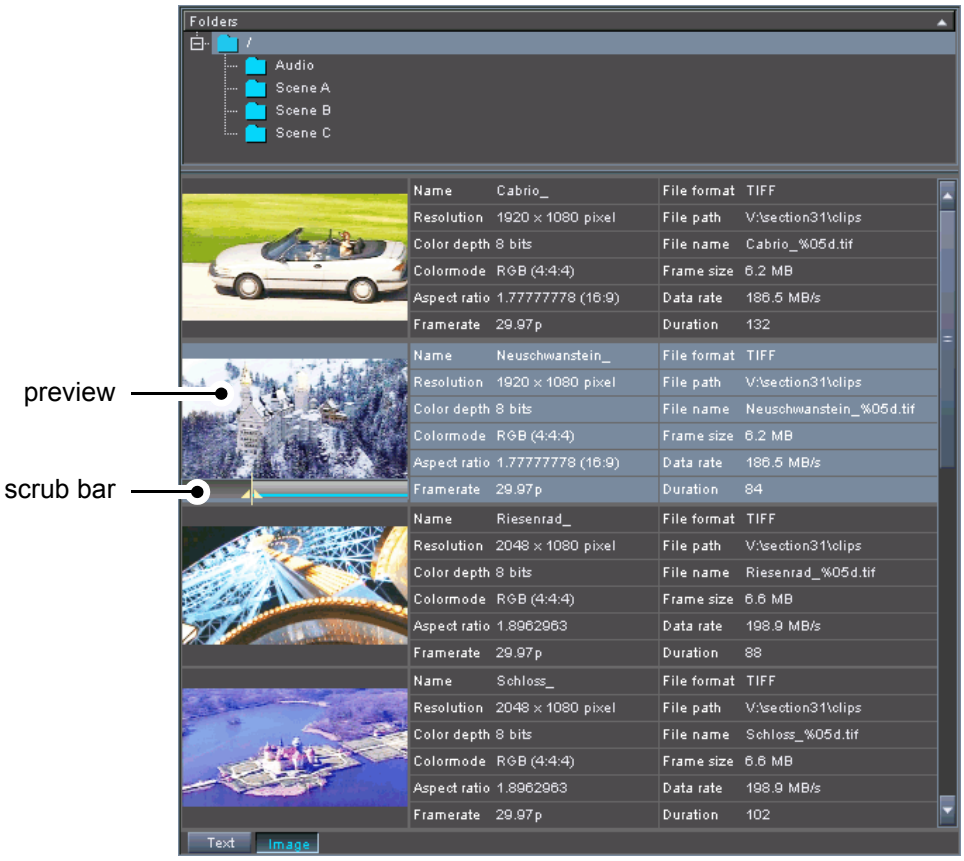


Figure 4-12: Clips in the contents area of the bin

In this section you can read what to do to administer clips.

For some of these tasks the context menu of the clips in the contents area is used. It provides different clip related functions, such as the adding of a new clip to the contents area of the bin or altering its properties.

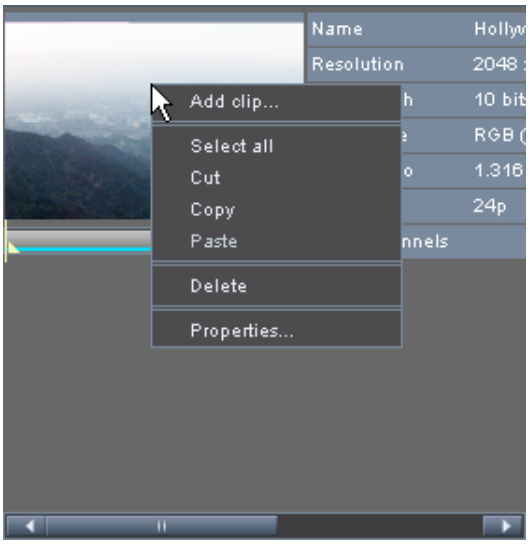


Figure 4-13: Context menu of a clip in the bin

If the contents area is empty of clips and you call up the context menu, not all menu options are displayed.

How to add clips to the contents area of the bin is in detail described in section “Adding Clips to the Bin” on page 4-6.

Selecting Clips

Clips can be selected or deselected easily in the contents area of the bin. For this perform one of the following procedures or their combination:

Although the table below describes how to select clips only, most procedures can be used to deselect clips as well.

Individual clips	Individual clips can be selected with a click of the mouse on the respective clip.
Several clips	Several clips can be selected disjointedly when clicking them while holding down the [Ctrl] key at the same time.
Range of clips	A range of adjoining clips can be selected by clicking one clip (the starting clip) and afterwards holding down the [Shift] key while clicking the clip that marks the end of the range.
All clips	All clips displayed in the contents area can be selected in one step either with the menu option ***Select all*** of the context menu or the keyboard shortcut [Ctrl + A] (when the contents area has the focus).

Cutting, Copying or Pasting Clips

Bin clips and timeline elements can be cut or copied to the clipboard of the operating system and afterwards pasted again at the location of your choice, either in the contents area of the bin or on a timeline track. The elements in the clipboard can also be pasted into a new project.

With this you can copy or move the selected element(s) within the bin (e.g. from folder to folder), within the timeline (e.g. between tracks or within one track), between the bin and the timeline tracks, or vice versa. Elements such as clips pasted into the timeline will be added at the current position of the timeline cursor. Furthermore, to paste clips to different timeline tracks rather than the first track you have to lock the

lower track numbers where the pasting should not occur (see section "Muting and Locking Tracks" on page 6-32).

When operating between bin and timeline or vice versa, the selected clip(s) will be added (i.e. copied).

For these procedures the focus must be set correctly. For example, when operating in the bin, its contents area (not the folder area) must have the focus.

The cut, copy and paste operations can be initialized either via the context menu of the selected element(s) or via the usual keyboard shortcuts (see section "Keyboard Shortcuts" on page A-6). Clips within the bin can also be copied or pasted between folders via a drag-and-drop procedure (see section "Sorting Clips into Folders" on page 4-19).

Sorting Clips

When the text information view is selected for the clips in the contents area of the bin (see section "Changing the View of Clips" on page 4-5), you can sort the clips easily:

- In the text information table simply click on the respective column heading to sort the entries under this column in ascending or descending order.

Then the clips will be sorted accordingly and the type of order will be indicated by the triangle to the right of the column heading. The sorting will also be available after switching to the thumbnail view of the bin again.

The already sorted clips can even be sorted further, i.e. they can be sorted by up to three criteria in total. With this you are able, for instance, to sort clips by their names as well as by their duration:

- To sort the list further hold the [Ctrl] key pressed while clicking with the mouse on another column heading.

Whether this sorting occurs in ascending or descending order is determined by the sorting order of the very first column heading, i.e. if the first selected column is sorted in descending order, all following sorting criteria will also be sorted in descending order. By repeating the last step you can sort the list of clips by up to three criteria, and the whole sorting will also be available when switching to the thumbnail view of the bin.

Sorting Clips into Folders

As soon as clips are present in the bin you can sort them into previously created folders (see section "Creating Folders" on page 4-15) to keep your project file in order and thus to perform a clip and project management.

- To sort the clips into folders simply select the clips in the contents area of the bin and drag and drop them to the respective folder in the folder area.

They are then present in this folder and you can view them again in the contents area when the folder is selected from the folder area.

If you drag and drop the clips while the [Ctrl] key is pressed, the clips will be copied instead of moved.

Preparing Clips for Editing Purposes

To begin an editing process you have to use the clips of the bin and drag and drop them to the timeline of the Edit Tool.

If a clip is selected in the contents area of the bin when in the thumbnail view, you can use the scrub bar below the thumbnail to preview the material and roughly select an inpoint for the respective clip:

The feature to select an inpoint can be enabled or disabled via the Configuration Tool. When disabled, every time you add a clip to the timeline of the Edit Tool the full clip will be added to the timeline regardless of the set scrub bar cursor (see "Fuze Configurations" user guide for more information).

- Move the scrub bar cursor to the left or right to preview your material and/or to select an inpoint:

Figure 4-14: Preview and setting of inpoint of the bin material

While adding a clip to the bin, you can already set the position of the scrub bar cursor and thus define a possible inpoint for the clip. During the adding (see section "Adding Clips to the Bin" on page 4-6) select the particular frame file where the inpoint should be set and add it to the bin. The scrub bar cursor of the thumbnail will be set accordingly.

- After that simply select the clip and drag it to a video or audio track of the timeline to start your editing work (see section "Adding Clips to the Timeline" on page 6-2).

The Edit Tool will use the selected inpoint as the starting point of your clip if this feature is enabled.

Changing the Properties of Clips

In the bin you can call up the properties of clips. Then you can, for example, assign flags to clips or change their properties, such as their names or video formats. Use the opening window to change the clip's properties if the DVS software does not recognize its video or audio format correctly:

- Call up the context menu on a clip present in the contents area of the bin and select the menu option ***Properties…***.

This will open the **'Clip properties'** window where you can change the clip's properties.

Some clip properties can only be altered if the clip is not already present in the timeline. Furthermore, the properties of audio multi-clips can only be changed by individually altering the properties of each audio clip in the provided bin subfolder of the audio multi-clip.

The window of the clip properties can also be opened from a clip added to the timeline (see section "The Context Menu of Video Clips" on page 6-55).

The properties of several clips can be changed in a single step by selecting the clips in the bin and then opening their properties.

The description of the **'Clip properties'** window is not part of this user guide. It is in detail described in the "Fuze Configurations" user guide.

Deleting Clips

To delete a clip from the contents area of the bin perform the following:

- Call up the context menu on the clip that you want to delete in the contents area of the bin and select the menu option ***Delete***.

Alternatively you may also select the clip and press the key [Del] on your keyboard.

After this a warning message will appear on the screen.

- If you want to delete the clip from the bin as well as all its representations present in the timeline, confirm the warning message.

This will delete the selected clip (either video or audio) from the contents area of the bin. If the clip was already added to the timeline, its representations there will be deleted as well.

4.3 Effects

The tab **Effects** of the tool area provides access to the effects delivered with the DVS software. After starting the software the bin is by default activated in the tool area. Once you select the tab **Effects** in the tool area, the area will look similar to the following:

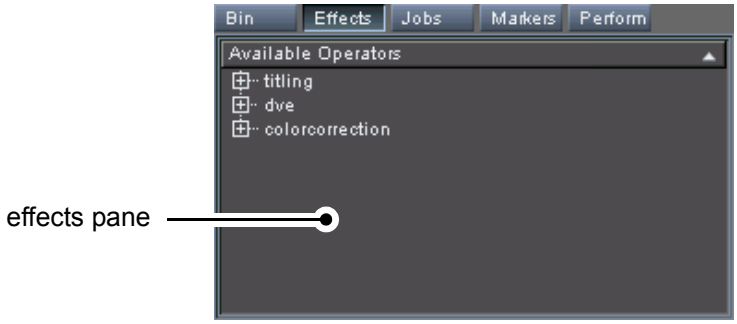


Figure 4-15: Available effects in the tool area

The effects pane offers you the available effects operators in a tree structure. Either by double-clicking an entry with the mouse or by clicking on the plus (+) or minus (-) sign in front you can expand or collapse the contents sorted under this entry. As soon as the individual effects operators are visible, you can start using them on clips in the timeline.

The individual effects operators provide you with additional editing features for your video processing tasks. However, they may be part of optional packages.

This section explains how to administer the effects available in the effects pane, i.e. how to create and apply preset effects.

Further information about effects in general as well as individual effects operators and their controls can be found in chapter "Timeline Element Properties" on page 7-1.

4.3.1 Adding Effects to the Timeline

The effects operators available in the effects pane can be applied to clips in the timeline easily. You simply have to add them to the effects list of the respective clip which is a part of its timeline element properties.

Information about how to add a clip to the timeline can be found in section "Adding Clips to the Timeline" on page 6-2.

You can call up the properties of a timeline element with a double-click of the mouse on the respective element in the timeline. Further information about this can be found in section "Accessing the Timeline Element Properties" on page 7-2.

Once at least one video clip is available in the timeline, it can receive an effect from the effects pane of the tool area. This is in detail described in section “Adding Effects” on page 7-10.

4.3.2 Creating Preset Effects

To apply the same effect settings of one clip to another the adjusted effect’s settings in the timeline element properties can be created as an independent effect easily. For this perform the following in advance:

- If not already available in the timeline element properties, apply the respective effect to a clip in the timeline as described in section “Adding Effects” on page 7-10.
- Adjust the settings of this effect according to your needs in the settings pane of the timeline element properties.

All changes to the effects operator are immediately applied to the selected clip in the timeline. Further information about the settings items and possibilities of each effects operator can be found in chapter “Timeline Element Properties” on page 7-1.

Then, to create preset effects three ways are available:

1. They can be created with a drag-and-drop procedure using the mouse.
2. They can be created via the keyboard and assigned to function keys.
3. They can be created with the help of the timeline element properties area.

The first two ways will be described in the following. A description how to operate with preset effects in the timeline element properties area can be found in section “General Items of the Properties Area” on page 7-3 and section “Using Preset Effects in the Properties Area” on page 7-14.

Creating Preset Effects with the Mouse

To create a preset effect with the mouse via drag and drop perform the following:

- If necessary, activate the tab **Effects** in the tool area of the Edit Tool.
- Take the adjusted effect from the effects list of the timeline element properties and drag and drop it back to the effects pane in the tool area. The effect can be dropped anywhere you like in the effects pane:

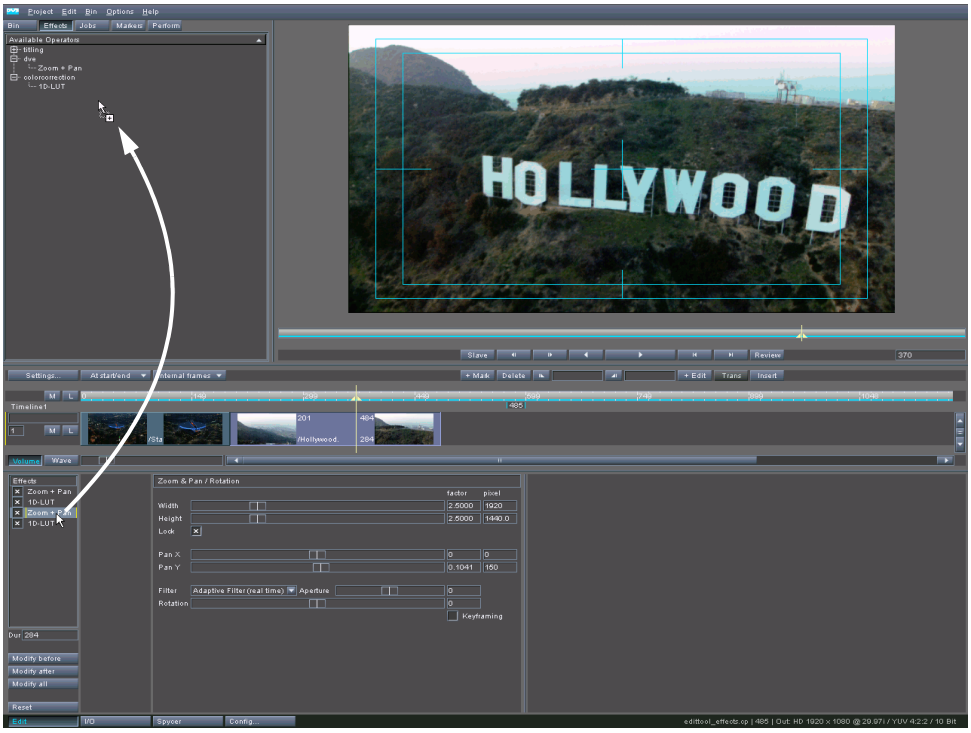


Figure 4-16: Drag and drop to create a preset effect

This will create a 'subeffect' under the respective effects operator in the effects pane. By performing the above said repeatedly you can create as many preset effects as you need.

Once dragged to the effects pane, the preset effect can be named to your liking easily (see section “Administration of Preset Effects” on page 4-26) and/or used immediately for other clips in the timeline (see section “Using Preset Effects” on page 4-25).

Creating Preset Effects via the Keyboard

Preset effects can also be created via the keyboard. Then they can be used as keyboard shortcuts to apply the respective preset effect. For this perform the following:

- Select the adjusted effect from the effects list of the timeline element properties.
- Then press the key combination [Shift + F<n>], with <n> as the number of the function key on your keyboard that you want to assign the preset effect to (i.e. keys [F1] to [F12]).

This will create a 'subeffect' under the respective effects operator in the effects pane. It will carry in its name the function key written in square brackets as the last element. By performing the above said repeatedly you can create as many preset effects for this effects operator as there are function keys available.

Once available in the effects pane, the name of the preset effect can be changed (see section "Administration of Preset Effects" on page 4-26) and/or it can be applied immediately to other clips in the timeline (see section "Using Preset Effects" on page 4-25).

The assigned function keys are valid for the selected effects operator alone, meaning you can assign the same function key(s) to different effects operators. For example, you can assign the [F2] key to a primary color correction as well as to a zoom-and-pan effect, each providing the correct effect settings for this respective effects operator when applied to a clip.

The assignment of function keys for preset effects can also be adjusted manually: The function key has to be stated last in the name of the preset effect in square brackets to enable it as a keyboard shortcut for a preset effect. For example, by changing a preset effect name to `<name string> [F2]` you will assign the function key [F2] to it.

4.3.3 Using Preset Effects

When preset effects are available in the effects pane of the Edit Tool, they can be applied to clips in the timeline easily:

Effect settings can also be transferred to other clips in the timeline with the help of the timeline element properties area (see section "General Items of the Properties Area" on page 7-3 and section "Using Preset Effects in the Properties Area" on page 7-14).

- A preset effect can be applied the same way as any default effect available in the effects pane of the tool area: Simply drag and drop it to the effects list of a clip's timeline element properties as described in section "Adding Effects" on page 7-10.

The predefined settings of this effect will be applied to the clip's timeline element properties right away.

You can also use the preset effects to alter settings of an effects operator already applied to a clip:

- Select the effects operator from the effects list of the timeline element properties so that its settings are visible in the settings pane to the right.

- After this drag and drop the preset effect into the settings pane.

In case the preset effect has been assigned a keyboard shortcut (see section "Creating Preset Effects via the Keyboard" on page 4-24), you may also press the function key of the respective preset effect to apply it.

By pressing an unassigned function key you can call up a list of all available preset effects for this effects operator. Then you can use it to select one of the preset effects and apply it (same as ***Load Preset***, see section "Using Preset Effects in the Properties Area" on page 7-14).

The predefined settings of the preset effect will be set for the already applied effects operator.

The settings will only be adjusted if the preset effect is of the same type as the effect selected from the effects list of the timeline element properties.

4.3.4 Administration of Preset Effects

To facilitate your work with preset effects they can be administered in several ways. For example, they can be renamed or deleted as well as saved or loaded. This section explains the various possibilities to administer preset effects.

Most of these tasks require the usage of the context menu of an effect in the effects pane (usually invoked with a right-click of the mouse):

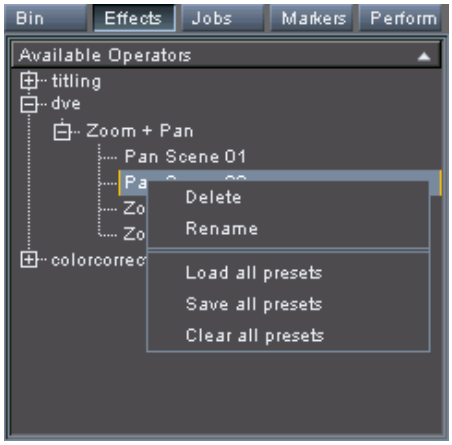


Figure 4-17: The context menu of the effects pane

Renaming Preset Effects

To rename a preset effect and thus to give it a different name once it was created in the effects pane perform the following:

- Call up the context menu on the respective preset effect and select the menu option ***Rename***.

  Alternatively you may click on a preset effect a second time with the mouse.

After this you can change the name of the effect:

- Enter the new name of the preset effect via the keyboard and confirm it with the [Enter] key.

Then the selected effect will be given the new name.

By renaming preset effects you can also assign function keys as keyboard shortcuts to them. For further information about the appropriate naming conventions see section "Creating Preset Effects via the Keyboard" on page 4-24.

Deleting Preset Effects

Preset effects can be deleted either individually or all in one step.

To delete an individual preset effect perform the following:

- Call up the context menu on the preset effect that you want to delete and select the menu option ***Delete***.

This will delete the respective preset effect where the context menu was invoked.

To delete all preset effects from the effects pane in one step perform the following:

- Call up the context menu on an entry in the effects pane and select the menu option ***Clear all presets***.

After this a warning message will appear on the screen.

- If you want to delete all preset effects from the effects pane, confirm the warning message.

This will delete all preset effects from the effects pane.

Saving All Preset Effects

You can save the contents of the effects pane, i.e. all preset effects, to a file:

- Call up the context menu on an entry in the effects pane and select the menu option ***Save all presets***.
- In the opening dialog window specify a storage path and file name for the effects file to be saved and confirm your entries with the button **SAVE**.

File extension:	`*.xml`	Effects file

This will save the preset effects to the specified file. By performing the above detailed procedure several times you can build up a library of different effects settings that can be loaded again later and thereby added to any project you want.

Loading All Preset Effects

Already saved preset effects can be loaded at any time into the Edit Tool again. With this you can add the presets available in the file to your current content of the effects pane.

Preset effects can be loaded from various sources: You can use a specially created preset effects file (see section "Saving All Preset Effects" on page 4-27), a standard project file or its derivatives (autosave or backup files, see section "Save" on page 8-5).

To load preset effects perform the following:

- Call up the context menu on an entry in the effects pane and select the menu option ***Load all presets***.

This will open the standard dialog window for the selection of a file.

- In the dialog window select the file that contains the desired settings from the list box or enter its name in the respective entry field.

File extensions:	`*.xml`	Effects file
	`*.cp`	Project file
	`*.cp.autosave`	Automatically saved intermediate situation
	`*.backup.cp`	Backup file of old project file

- Once the appropriate file is selected, confirm your choice with the button **OPEN**.

The preset effects available in the file will now be added to the effects pane: In case the effects pane already contains preset effects, they are not deleted but will remain there, while the new preset effects will be added.

Sorting Default and Preset Effects

The default effects as well as preset effects can be sorted. You can sort them in descending or ascending order. If your project contains a lot of preset effects, this may make it easier for you to find an individual effect. To sort the effects do the following:

- Simply click on the title bar **Available Operators** above the effects pane with the mouse.

This switches between a descending and ascending order of the effects tree as well as of all effects visible in the effects pane.

4.4 Jobs

The tab **Jobs** details information about the status of render operations that have been initialized in the DVS software. On this tab you can find, for example, information about the progress of prerenderings. For each triggered job one entry will be displayed:

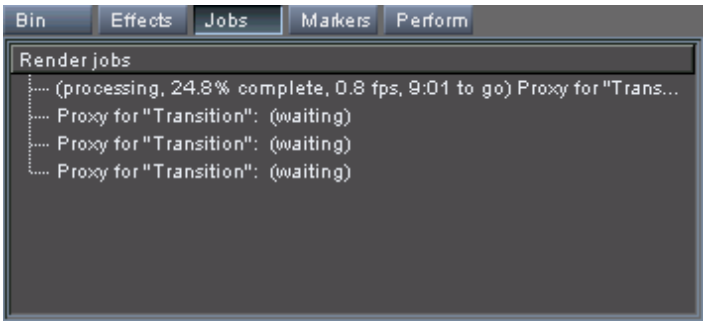


Figure 4-18: Jobs in progress

Whenever possible, the render jobs will be performed in the background of the system, i.e. during their creation you can continue to work in the timeline of the Edit Tool as usual. In case of several render jobs, they will be processed one at a time in the order indicated. Once the render operations are finished, their entries will disappear from the list of the **Jobs** tab.

For further information about renderings in general see section "Working with Prerendered Data" on page 2-9 or section "Finalizing the Timeline" on page 6-68.

The corresponding clip and processed image will be displayed in the video overlay when selecting from the list the job that is currently under processing.

When entries are displayed in the list on the tab **Jobs**, you can cancel the respective job and thus delete its created files. For this call up the context menu on the job entry that you want to abort. It offers you the following:

Delete	Cancels the selected render job where the context menu was called and deletes already rendered files.
Delete all	Cancels all render jobs listed on the tab **Jobs** in a single step. Already rendered files will be deleted as well.

4.5 The Marker Table

In the timeline of the Edit Tool you can place markers at certain positions, e.g. as a reminder to cut the clip at this position at a later stage or other reasons. These markers can be placed either manually in the timeline of the Edit Tool or automatically.

Additional information about markers and their placing can be found in section "Marking Positions in the Timeline" on page 6-47 as well as in section "The Drop Table" on page 4-38.

Once markers are positioned in the timeline, the tab **Markers** of the tool area provides further information about them. After its selection and when markers are available in the timeline, the area will look similar to the following:

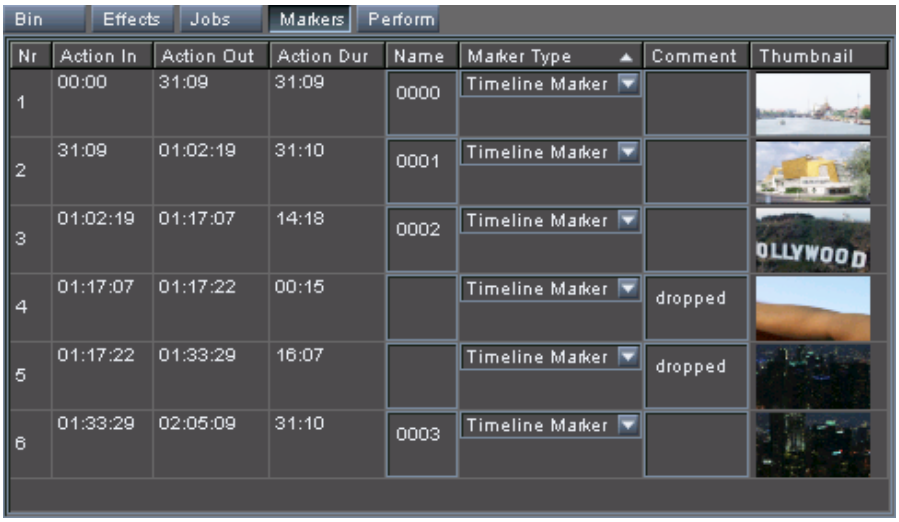


Figure 4-19: List of timeline markers in the tool area

The tab **Markers** provides in a table a list of all timeline markers that are currently available in the timeline of the Edit Tool. The individual entries show the positions of the markers in the timeline and provide further details if available:

Column	Description
Nr	Number of the marker in the timeline.
Action In	Shows the actual position of the marker or, in terms of a timeline stretch indicated by the marker, its 'Action Inpoint'. It is displayed either in timecode or in frames notation, depending on the selected notation for the Edit Tool (see section "About Timecode / Frame Number Fields" on page 2-14).

Column	Description
Action Out	Shows the end of the timeline stretch indicated by the marker (see 'Action In').
Action Dur	Shows the duration of the timeline stretch indicated by the marker (see 'Action In').
Name	In the fields of this column you can enter a customized name for the marker. The number of characters is not limited and all characters are allowed.
Marker Type	Indicates the type of the marker. Further information about the available types can be found in section "Marking Positions in the Timeline" on page 6-47.
Comment	Same as the column 'Name' but used for comments about this marker. For some markers comment entries will be automatically generated by the Edit Tool. However, they can be easily changed and adapted afterwards.
Thumbnail	This column shows a preview of the frame where the marker is positioned in the timeline as a thumbnail. The thumbnail view can be configured via the Configuration Tool (group ***Markers***, see "Fuze Configurations" user guide).

When selecting an entry from the list with a double click of the mouse, the timeline cursor will jump to the respective timeline marker on the timeline.

The entries in the table can be sorted in descending or ascending order same way as the bin when in the text information view. For further information about this see section "Sorting Clips" on page 4-19.

Some columns, such as 'Thumbnail', cannot be used for a sorting.

4.6 The Performance Monitor

With the performance monitor of the DVS software you can monitor the workload of the DVS system during a real-time operation. Thus you can verify, for example, the status of the hard disks of the storage as well as of certain files.

After starting the DVS software and thus the Edit Tool the bin is by default activated in the tool area. As soon as you select the tab **Perform** in the tool area, the area will look similar to the following figure:

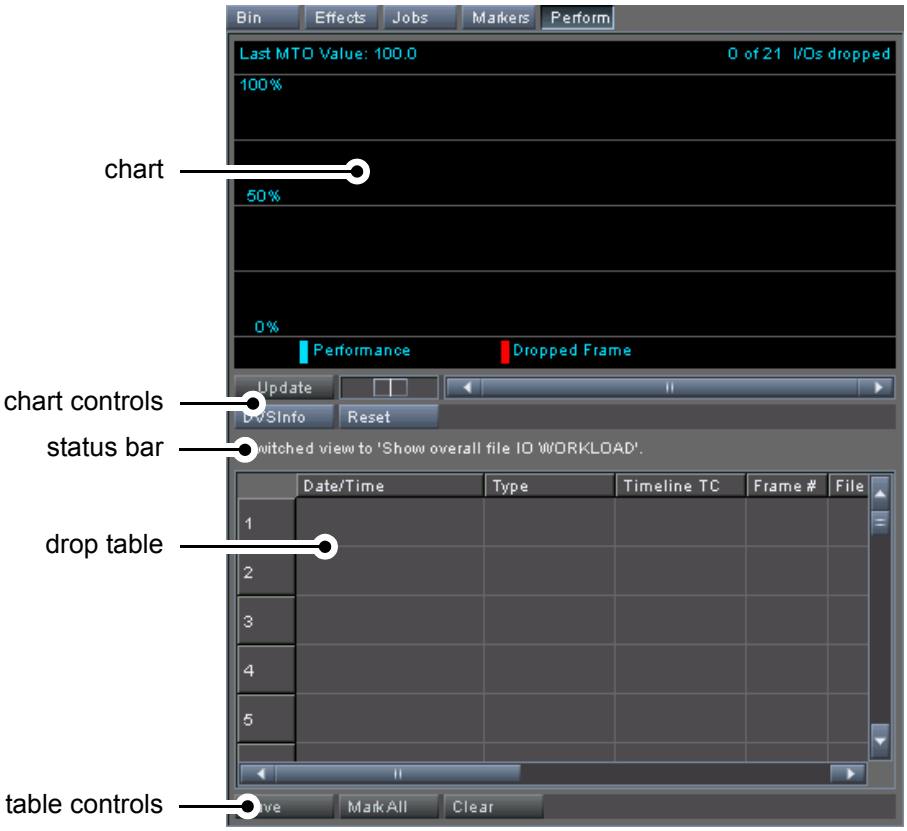


Figure 4-20: The performance monitor

The performance monitor provides you with detailed information about dropped frames (frames that the DVS system could not load or write in time during a real-time operation). Via the table below you can get information about the location where the drop took place.

For this the performance monitor provides the following items:

chart — The chart offers you a graphical interpretation of the measured workload of the system. During a play-out or record operation the processing workload will be shown via bars in the chart. It is in detail explained in section “The Chart” on page 4-34.

chart controls	With the chart controls you can control the appearance of the results in the chart or create a proprietary DVS information file. They are explained in section "Chart Controls" on page 4-36.
status bar	Right below the chart controls you can find a status bar which will provide you with status messages about the operation of the performance monitor. It is described in section "The Status Bar" on page 4-37.
drop table	As soon as drops occur during a real-time operation, entries will appear in the drop table, one for each drop that could be detected. The entries provide information, for example, about the date and time when the drop occurred or about the file that was the cause for this drop. You can find a description of the drop table in section "The Drop Table" on page 4-38.
table controls	Via the table controls you can either save the results shown in the drop table to a file or set markers in the timeline of the Edit Tool where the respective drop took place. They are in detail explained in section "The Table Controls" on page 4-39.

If the chart controls, the drop table as well as the table controls are dimmed, the performance monitor is turned off. Then, in the status bar the message 'Performance Monitor disabled' will be displayed. To measure the workload of the system with the performance monitor it has to be enabled via the Configuration Tool of the DVS software (see "Fuze Configurations" user guide for more information).

The DVS software is able to process several different image files simultaneously (multi-threaded I/O mode). Therefore, one bar drawn in the chart may represent several file accesses.

Although the multi-threaded I/O mode is the recommended mode for the DVS software, it can be set to a single-threaded I/O mode via a setting available in the Configuration Tool (see "Fuze Configurations" user guide).

As soon as the software is started, the performance monitor will write by default a drop report into the subdirectory *drop_reports* under the directory *log* in the application data path of the current user (*%APPDATA%\DVS\Clipster*, for the actual location type in at a command line `echo %APPDATA%`, then press [Enter]). There will be one report written per session. However, it will inform you about drops that occurred during this session only when the performance monitor is enabled. Then the report contains information about, for example, the date and time when the drop occurred or about the file that was the

cause for this drop. If the performance monitor is disabled, the log file will be written but provide no information about drops that occurred.

Drops are reported by the real-time core of the DVS software. In some cases it may not be able to provide information about the file name and/or path.

Only the last ten reports will be stored.

Individual frames missing in an image sequence (clip), i.e. image files that are not present on the storage at all, are not registered as drops. You can check the consistency of your material added to the bin with the menu option ***Check Bin*** on the ***Bin*** menu (see section "Check Bin" on page 8-15 and section "Consistencies of Clips" on page 6-57).

You can retrieve the location of files where drops occurred also by setting timeline markers with the help of the drop table or its controls (see section "The Drop Table" on page 4-38 and section "The Table Controls" on page 4-39).

This section explains the basic usage and the items of the performance monitor.

4.6.1 The Chart

The chart of the performance monitor provides a graphical representation of the measured performance of the system. During play-out or record operations the performance will be displayed via bars in the chart.

The DVS software can operate in two different I/O modes: It can process several image files simultaneously (multi-threaded I/O mode) or one file at a time (single-threaded I/O mode).

Although the multi-threaded I/O mode is the recommended mode for the DVS software because it is more flexible and faster, it can be set to a single-threaded I/O mode via a setting available in the Configuration Tool (see "Fuze Configurations" user guide for more information).

The performance monitor can be switched between two measurings for the performance of the system:

- *Overall file I/O workload*
  With this setting the performance monitor measures the overall workload of the system that occurred during a timed interval.
- *Individual file I/O duration*
  This measuring is especially useful when operating in a single-threaded I/O mode. Then the performance monitor displays the access times of single files.

You can switch between the two measurings with a setting available in the Configuration Tool (see “Fuze Configurations” user guide). They and their effect on the drawn charts will be explained in the following.

Missing frames on the storage are not registered by the performance monitor as drops.

The Chart in 'Overall File I/O Workload'

If the performance monitor is set to the 'overall file I/O workload' setting, the chart indicates the overall workload of the system during a timed interval (40 ms).

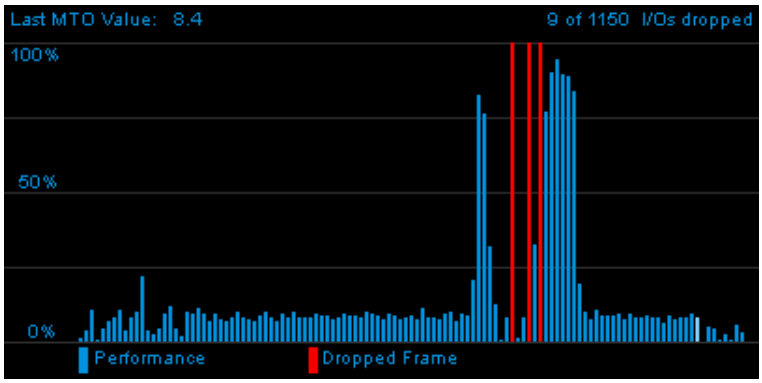


Figure 4-21: Chart of performance monitor (overall file I/O workload)

With this setting you can find at the top left of the chart the value of the last multi-threaded operation. It details in certain intervals during operation the workload of all threads in percent, i.e. the value of one bar in the chart.

At the top right of the chart you can find an indication about how many frames were processed total and how many drops occurred during this time.

When operating, the system's workload is displayed via blue bars in the chart. The bars may well reach the 100% line during an operation which does not necessarily mean that a drop may occur soon. It simply shows that all threads of the software were processing continuously at that point of time and that no thread was idle. Drops exceed the workload of the system shown in the chart. They are displayed as bars in red that are cut at the top.

The Chart in 'Individual File I/O Duration'

If the performance monitor is set to the 'individual file I/O duration' setting, the chart of the performance monitor shows the access times of single files, which is especially useful when the system is operating in the single-threaded I/O mode. If used in the multi-threaded I/O mode,

the drawn access times to a single file (one bar) may be longer because several files were read/written at the same time.

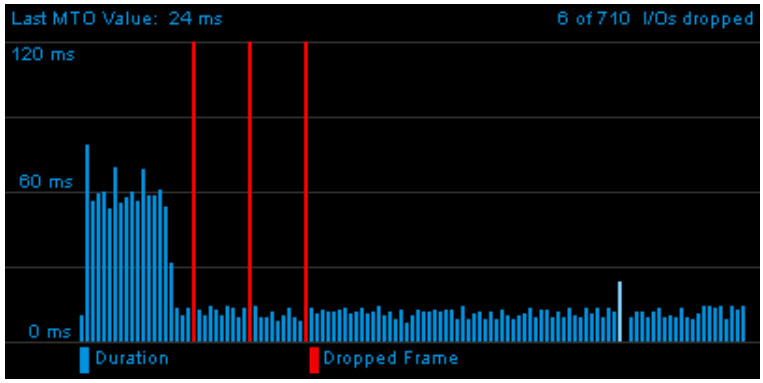


Figure 4-22: Chart of performance monitor (individual file I/O duration)

At the top left of the chart you can find the last measured access time. It details in certain intervals during operation the measured access time in milliseconds, i.e. the value of one bar in the chart.

At the top right of the chart you can find an indication about how many frames were processed total and how many drops occurred during this time.

When operating, the access times are displayed via blue bars in the chart. If bars reach the top line during an operation, it may indicate difficulties during the loading of particular files. However, clips of a higher resolution usually require more time to access, especially when transitions are applied to the timeline. Then, high bars do not necessarily mean that a drop may occur soon. Drops are detected by the real-time core of the DVS system and they will be displayed as bars in red that are cut at the top.

4.6.2 Chart Controls

With the chart controls you can control the appearance of the chart or create a proprietary DVS information file.

The chart controls provide the following items:

If the controls appear dimmed, the performance monitor is disabled. To use it you have to enable it first. This can be done with the Configuration Tool (see “Fuze Configurations” user guide for more information).

Update — Currently this button provides no functionality.

The slider to the right of the **UPDATE** button determines the viewing resolution of the chart. When pulled to the left, you will receive a higher resolution: The bars displayed in the chart will get thinner and more bars will be displayed in the chart. When pulled to the right, the bars will get thicker and fewer bars will be visible.

In case of problems with your DVS system you may get asked by the DVS service department to create and generate log files. Then you may use the button **DVSINFO** to store the most important information in one file (in ASCII format). The file name of the log file will be `requested_dvsinfo_<system time>.txt`, with the `<system time>` added in the format `yyyy-mm-dd_hh-mm-ss`. It will be stored in the subfolder *`dvsinfo`* in the *`log`* directory in the application data path of the current user (*`%APPDATA%\DVS\Clipster`*, for the actual location type in at a command line `echo %APPDATA%`, then press [Enter]).

When exiting the DVS software, a DVS information file (without `requested_` in front of the file name) is by default written to the stated location.

Only the last ten files will be stored.

The button **RESET** enables you to set the indication about how many frames were processed total and how many drops occurred during this time at the top right side of the chart back to zero. Afterwards you may start a new evaluation of the real-time performance of the DVS software which in turn may report new drops in the table.

This button does not reset the drop table of the performance monitor. For this you have to use the button **CLEAR** of the table controls (see section “The Table Controls” on page 4-39).

4.6.3 The Status Bar

Right below the chart controls you can find the status bar which will provide you with status messages about the operation of the performance monitor.

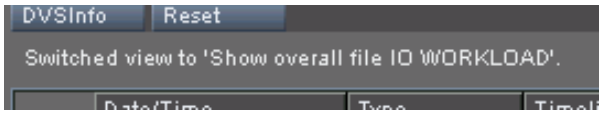


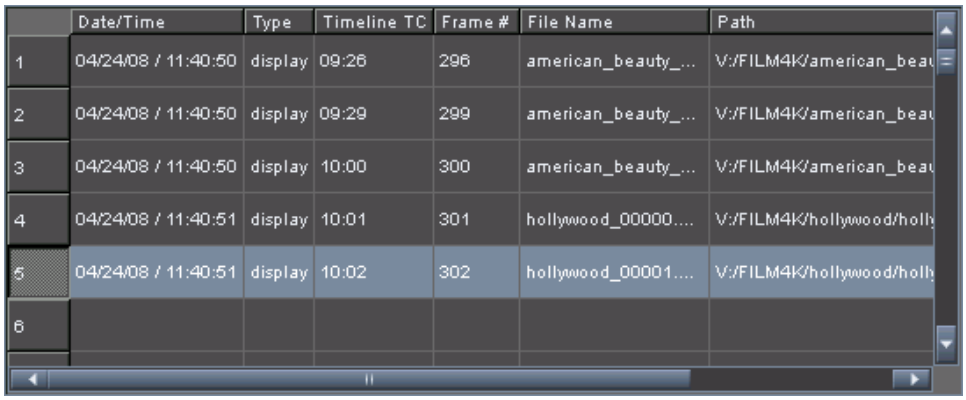
Figure 4-23: Status message in the status bar

The messages in the status bar inform you, for instance, about whether the performance monitor is enabled and ready to measure the workload.

4.6.4 The Drop Table

As soon as drops occur during your real-time operation, entries will appear in the drop table, one for each drop that could be detected.

If the drop table is unavailable (dimmed), the performance monitor is disabled. To use it you have to enable it first. This can be done with the Configuration Tool (see "Fuze Configurations" user guide).



	Date/Time	Type	Timeline TC	Frame #	File Name	Path
1	04/24/08 / 11:40:50	display	09:26	296	american_beauty_...	V:/FILM4K/american_beau
2	04/24/08 / 11:40:50	display	09:29	299	american_beauty_...	V:/FILM4K/american_beau
3	04/24/08 / 11:40:50	display	10:00	300	american_beauty_...	V:/FILM4K/american_beau
4	04/24/08 / 11:40:51	display	10:01	301	hollywood_00000....	V:/FILM4K/hollywood/holl
5	04/24/08 / 11:40:51	display	10:02	302	hollywood_00001....	V:/FILM4K/hollywood/holl
6						

Figure 4-24: Drop table of performance monitor

The entries provide information, for example, about the date and time when the drop occurred or, if detected as well, about the file that was the cause for this drop.

Drops are reported by the real-time core of the DVS software. In some cases it may not be able to provide information about the file name and/or path.

You can retrieve further information about the location where the drop occurred by double-clicking an entry in the drop table. Then the timeline cursor will jump to the approximate location where the drop happened and a timeline marker will be placed at this position in the timeline.

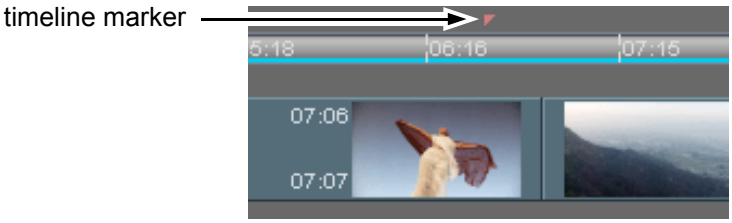


Figure 4-25: Timeline marker in timeline

Additional information about timeline markers can be found in section “Marking Positions in the Timeline” on page 6-47 and section “The Marker Table” on page 4-30.

Furthermore, with the controls below the table you can, for example, save the results shown in the drop table to a file (see section “The Table Controls” on page 4-39).

4.6.5 The Table Controls

With the table controls below the drop table you can, for example, save the results written in the drop table to a file or set markers in the timeline of the Edit Tool where drops occurred.

Additional information about timeline markers can be found in section “Marking Positions in the Timeline” on page 6-47 and section “The Marker Table” on page 4-30.

The following controls are available:

Save

This button saves the entries in the drop table to a file. Enter in the opening dialog window a storage path and file name for the drop table list to be saved. Then confirm your settings with the button **SAVE** and the table will be saved to the specified location.

Compared to the drop report saved by default by the performance monitor, this button only saves the entries currently available in the drop table (see section “The Performance Monitor” on page 4-32).

Mark All

As soon as the real-time operation is finished and when drops have occurred, the button **MARK ALL** will be available. With it you can retrieve further information about the locations where drops occurred. It places timeline markers in the timeline of the Edit Tool for each entry available in the drop table.

Once the placing of the markers is finished, this button shows the labeling **UNMARK ALL**. Then you can remove with it all timeline markers from the timeline in one step.

The **MARK ALL** button will not be available in the I/O Tool because this module provides no timeline where markers can be set.

The **CLEAR** button deletes all entries displayed in the drop table. Afterwards you may start a new real-time operation which in turn may report new drops in the table. This button will be available as soon as drops are displayed in the drop table and the real-time operation is finished.

4.6.6 Using the Performance Monitor

The performance monitor monitors the hard disk accesses of the DVS software to the video data. With it you can verify, for example, the status of the hard disks of the storage array as well as of certain files on the array.

Individual frames missing in an image sequence (clip), i.e. image files that are not present on the storage at all, are not registered as drops. You can check the consistency of your material added to the bin with the menu option ***Check Bin*** on the ***Bin*** menu (see section "Check Bin" on page 8-15 and section "Consistencies of Clips" on page 6-57).

This section will explain shortly how to use the performance monitor: First, it will be described how to prepare the monitor and the DVS software for the measuring of the system's workload. After that follows a description of how to perform the actual test with a play-out operation.

Although the following describes how to use the performance monitor during a play-out of video data, it can also be used during a record operation. Then it will measure the workload when writing files to the storage instead of reading them. A record can be performed with the I/O Tool (for further information see the "Fuze I/O Tool" user guide).

Preparing the Software and the Performance Monitor

This section explains how to prepare the DVS software as well as the performance monitor for the measuring of the system's workload during a play-out operation.

After starting the software and thus the Edit Tool the bin is by default activated in the tool area. Then perform the following:

- Add at least one clip to the bin of the Edit Tool.
- Afterwards take this clip and add it to a video track of the timeline (see section “Adding Clips to the Timeline” on page 6-2).

For our example described here you may also set transitions and/or apply effects to the clip(s) in the timeline as long as they are not a subject to a prerendering (see section “Prerendering of Timeline Elements” on page 6-41).

- Then select the tab **Perform** in the tool area of the DVS software.

The tool area switches to the performance tool of the DVS software:

If the controls of the performance monitor appear dimmed, the performance monitor is disabled. To use it you have to enable it first. This can be done with the Configuration Tool (see “Fuze Configurations” user guide for more information).

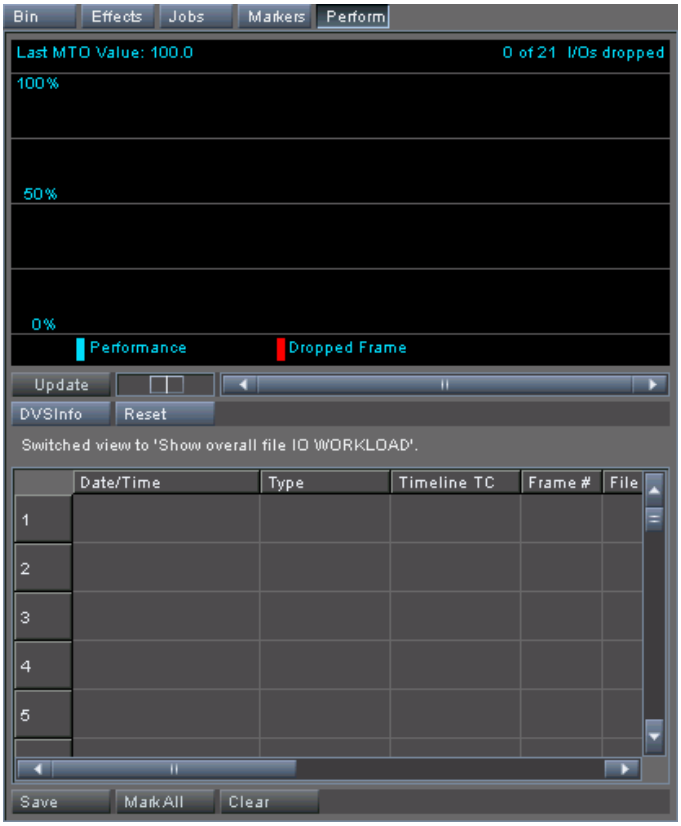


Figure 4-26: The performance monitor

After this the performance monitor is ready to assess the performance (workload).

Measuring the Performance

Once the performance monitor and the software are prepared as described in section “Preparing the Software and the Performance Monitor” on page 4-40, you can begin the assessment of the workload:

- Start the play-out operation of the material added to the timeline with the play button available in the control area of the Edit Tool (see section “Controls” on page 5-11).

This will start the play-out of the video material added to the timeline and as soon as the play-out starts, the performance monitor will start its monitoring of the performance as well:

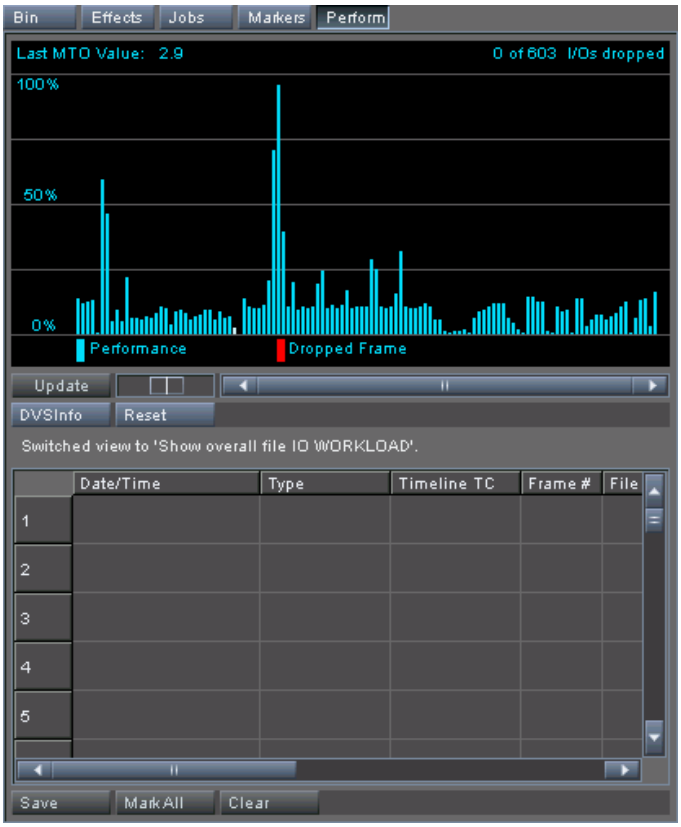


Figure 4-27: Healthy performance

Because the DVS system is capable of handling even high-resolution material in real time, you usually will not encounter any problem: The performance bars will always appear in blue and no drops should occur. The DVS software is able to process several different image files simultaneously (multi-threaded I/O mode) and one bar shown in the chart may represent several file accesses. Thus the bars may well reach the 100% line during an operation which does not pose a problem to the real-time operation. It simply shows that all threads of the software are currently processing and no thread is idle.

If drops occur, they will be entered in the drop table of the performance monitor and red bars will appear in the chart. Then please proceed as follows:

- Check the position of the drops on the video timeline by double-clicking entries individually or by selecting the **MARK ALL** button of the table controls.
- Afterwards perform the play-out operation and the checking of the drop positions again.
- Then compare the results and confront them with the following table:

Marker Position	Timeline Element	Probable Cause	Solution
At certain position(s)	On video clip(s) or transitions	Material at certain frames faulty	Check the material on the storage and replace the faulty files. After this the problem should be resolved.
At random	Within certain video clips	The material has a resolution that is too high	Finalize the timeline to a format that can be handled in real time (see section "Finalizing the Timeline" on page 6-68). After this the problem should be resolved.
		The storage location is not real-time capable	Move the material to a real-time capable storage.
		The storage location where the material is stored is too full	It is recommended to use only 85% of the overall storage capacity. If the storage is too full, delete some of the data.
	On transition(s)	Timeline material has a resolution that is too high for two simultaneous video streams	If the respective transitions are displayed in the timeline without a pre-rendering indication, reduce the value that indicates when a timeline element has to be prerendered (see Configuration Tool in the "Fuze Configurations" user guide). Then prerender the transitions (see section "Prerendering of Timeline Elements" on page 6-41). After this the problem should be resolved.

Marker Position	Timeline Element	Probable Cause	Solution
	Throughout the timeline	The storage location(s) is(are) not real-time capable	Move the material to a real-time capable storage.
		The storage location(s) where the material is stored is(are) too full	It is recommended to use only 85% of the overall storage capacity. If the storage(s) is(are) too full, delete some of the data.
		Configurations of the system have been altered so that it is no longer capable of real-time operations	Contact the DVS service department.
		One or more hard disks of the storage array may be damaged	Replace the defective disk(s) as described in the hardware guide of the DVS system.

If drops occur during a record operation with the DVS system, one or more hard disks of the storage array may be damaged. In this case replace the defective disk(s) as described in the hardware guide.

After applying the recommended solution the problem should be resolved. However, if the drops persist, please contact the DVS service department.

The Control Area

To the right of the tool area you can find the control area of the Edit Tool. This area is used to pre- and review your current project:

Figure 5-1: The control area

In the control area you can see at its top the video overlay which is used to view the video material. Below the video overlay a scrub bar of the timeline is available. At the bottom of the control area the controls to play out and move within your current project are located. All items of the control area are described in detail in the following sections.

5.1 Maximizing the Control Area

By performing a double-click with the mouse on the upper part of control area (video overlay) you can maximize the control area. With this all other areas of the user interface will be hidden instantaneously and you can see the video overlay enlarged. The previous layout of the user interface can be restored by performing the same procedure again.

5.2 The Video Overlay

With the video overlay you can view the material present in the timeline. All clips and added operators to the timeline – as long as they do not require prerendering – can be viewed in real time. While working, the video overlay will always adjust to your moves on the timeline. This provides a total control for your work and you can immediately monitor your progress.

The video overlay will adapt its layout (aspect ratio) to the currently set video output raster of the timeline. Due to the fact that the output raster may have an effect on the video material of the timeline, you can use the video overlay to see its output effect immediately. For example, clips of different sizes in the video track(s) of the timeline may get cropped, stretched or compressed, or scaled according to your settings for the respective clips and your output settings. All these effects can be viewed instantaneously via the video overlay. Further information about how to set the video output raster can be found in section "Configuring the Video and Audio Output" on page 6-11.

This section describes the possibilities of the video overlay in detail.

5.2.1 Configuring the Video Overlay

The video overlay can be configured to your liking. You can adjust the safety areas as well as the size of the overlay.

The video overlay provides action safety and title safety areas that can be turned off or adjusted to your personal needs. You can set the color as well as the sizes of these areas.

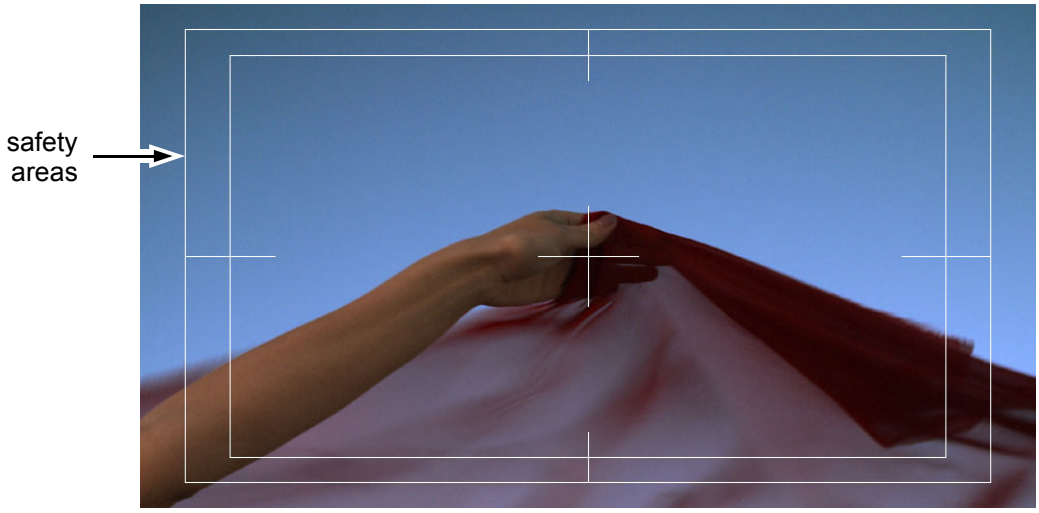


Figure 5-2: The video overlay

This can be done with the Configuration Tool. Please refer to the "Fuze Configurations" user guide for further information.

Furthermore, you can adjust the size of the video overlay with the edges of the control area at its very bottom and to the left. Simply enlarge or reduce the area by dragging the edges (see section "Changing the Size of the Tool Area" on page 4-2).

5.2.2 The Video Scopes

To make sure that the images comply with broadcast standards, the video overlay of the Edit Tool provides video scopes to help you during such tasks. With them you can view the material, image for image if necessary, and assess the different color values. The scopes can be activated via the context menu of the video overlay:

Figure 5-3: The context menu of the video overlay

The DVS software offers various scopes to choose from. Among them you can find waveform, vectorscope and parade monitors. Once one of the available video scopes is selected, the control area will change its appearance and two items will be displayed: the left one shows the selected video scope, while the right one displays the video overlay as usual.

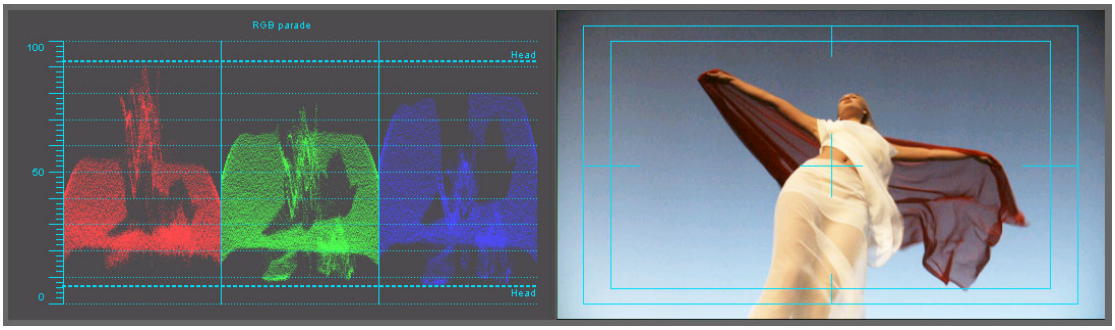


Figure 5-4: Video scope in control area

With the menu option ***Above overlay*** available on the context menu of the control area this layout can be altered. When the menu option is deactivated, the scope and the overlay are displayed separately in the control area; when activated, the selected video scope will be superimposed on the video overlay.

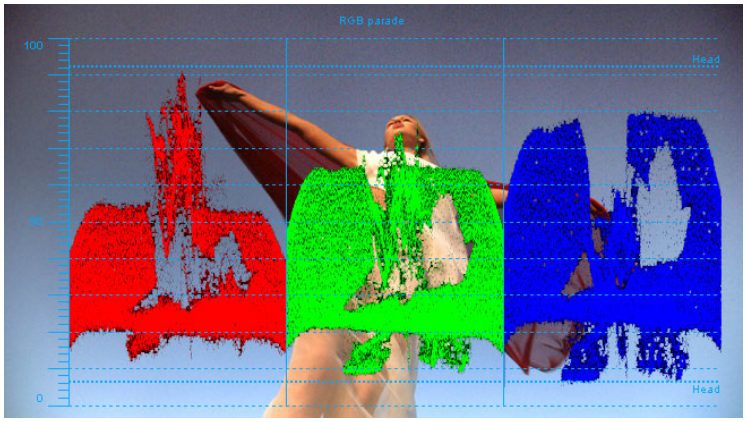


Figure 5-5: RGB parade superimposed on video overlay

Most video scopes provide in its graph an indication of the headroom. In case your project has to provide a legal broadcast signal no color component should reach into that area. When staying on the computer side and working with RGB material, the headroom may be disregarded.

Further information about color spaces, headroom and full value ranges as well as color space conversions can be found in the “Fuze Configurations” user guide.

By using the menu option ***Analyzer off*** the selected video scope can be turned off again at any time.

The color of the graph, of the graph's background as well as of the drawn data (for vectorscopes and the YUV parade only) can be adapted to your needs via the Configuration Tool. Please refer to the "Fuze Configurations" user guide for further information.

Vectorscope 100%

The vectorscope 100% is most suited when playing out in YUV. It displays the chroma information of an output image without its luma information, i.e. the color components U and V without Y.

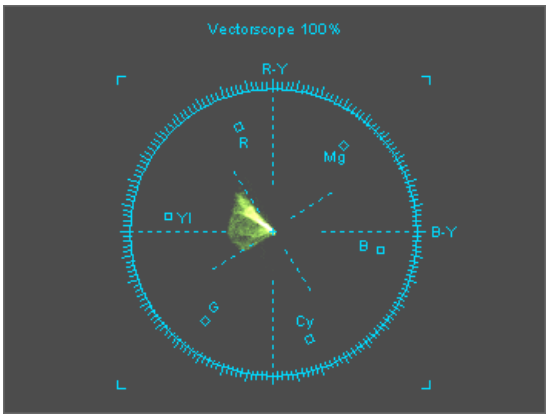


Figure 5-6: The vectorscope 100%

This scope shows a circular graph where the center represents no chroma (color saturation zero). All white, black and grey parts of the output image are located at the center of the graph. The more the color values of an image increase, the farther away the graph's dots will be dispersed from the center. Regarding color the abbreviations 'R', 'G' and 'B' of the video scope indicate the usual primary colors red, green and blue, while 'Mg' stands for magenta, 'Cy' for cyan and 'Yl' for yellow (secondary colors).

Vectorscope 75%

The vectorscope 75% is the same as the vectorscope 100% (see section "Vectorscope 100%" on page 5-5). However, to provide safe colors, for example, for a legal broadcast signal, this video scope already indicates the safety area of the colors: The dotted line represents the full color values (100%) whereas the squares show the colors with 75% of their values.

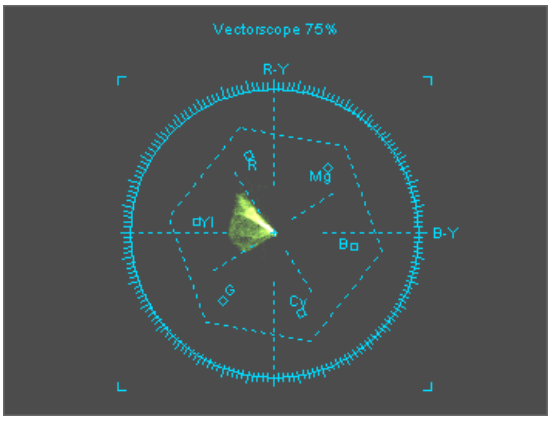


Figure 5-7: The vectorscope 75%

The colors of the output image should be located within the area enclosed by the squares. Any point beyond them will be located inside the headroom and it may not be possible to give it out correctly during a play-out.

RGB Parade

The RGB parade displays graphically the distribution of the color components red, green and blue (RGB). Each component is displayed separately. For a parade the output image is evaluated line by line, and for each line the color distribution is drawn.

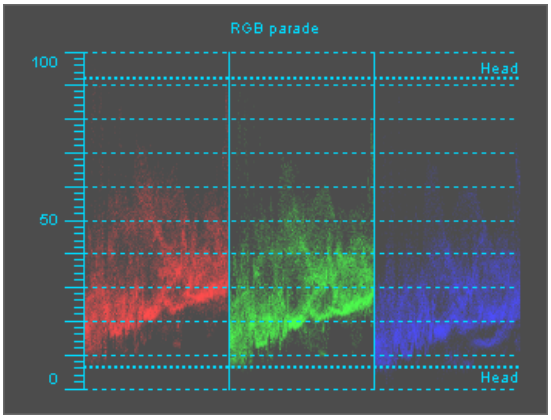


Figure 5-8: The RGB parade

White areas of an output image would appear as an accumulation of dots in all three color components near the 100% line (minus headroom, if applicable). Black image areas would be displayed as an accumulation of dots in all three color components near the 0% line (plus headroom, if applicable). When playing out in RGB, this video scope can be used to evaluate the color distribution of the output image accurately.

YUV Parade

The YUV parade displays graphically the distribution of the components Y, U and V separately. The Y graph is shown on the left side, while the color difference signals U and V are displayed in the middle and to the right. As with the RGB parade the output image is evaluated line by line and for each line the distribution is shown.

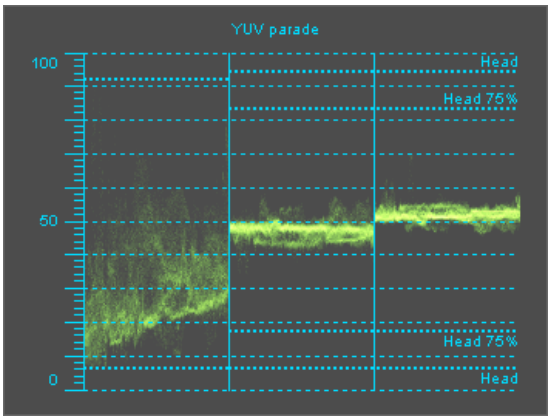


Figure 5-9: The YUV parade

However, because U and V can take on negative as well as positive values their graphs usually are distributed around a center line. It can be found in the middle of the YUV parade because in digital video an offset of 128 (for 8 bit data) is added to U and V to get rid of the negative value. In case the output image is black and white only, U and V would be zero (128) resulting in a flat line in the middle of their graphs. The more the color saturation of an output image increases, the more the two graphs would be dispersed. Values of U greater than 50 in the graph indicate positive values and blue hues, while values of less than 50 indicate yellow hues and negative values. The same applies to V with the exception that values greater 50 would indicate red hues, and values less than 50 cyan hues. Regarding the luma signal Y a value of zero indicates black, while a value of 100 represents white. Nevertheless, especially when working with YUV, a reserved headroom for all components should be observed.

Waveform

The waveform video scope is similar to the RGB parade. It displays graphically the distribution of the color components red, green, and blue (RGB) of an output image. For this the image is evaluated line by line and for each the color distribution is displayed.

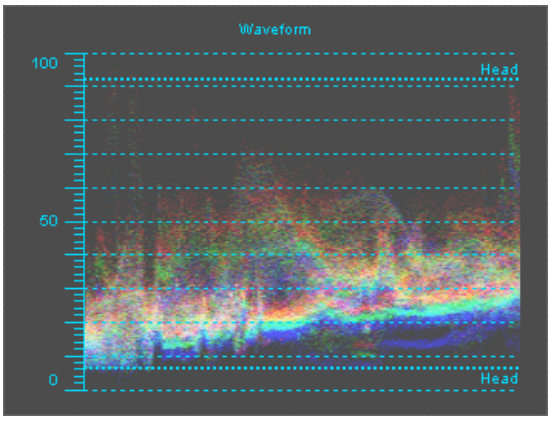


Figure 5-10: The waveform

The horizontal scale of the scope represents the image's horizontal direction, while the vertical axis shows the RGB levels. The color components are drawn in their respective colors. The more scan lines of an image provide the same color at the same horizontal location, the more saturated the color will be in the graph. In case different colors are located at the same position with the same intensity, they would be added in the graph until the respective position shows white.

5.3 The Scrub Bar of the Control Area

Below the video overlay a scrub bar of the timeline is available.

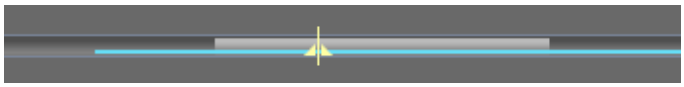


Figure 5-11: Timeline scrub bar

In contrast to the timeline of the timeline area where you can zoom in and out (see chapter "The Timeline" on page 6-1), the scrub bar of the control area always shows the complete timeline of the loaded project. You can use the scrub bar for overview purposes or to move within your project.

The scrub bar of the control area provides several features, for example, different colors indicating the state of the timeline. The following features are provided by the scrub bar:

Items of Scrub Bar	Description
in dark grey	Parts of the scrub bar displayed in dark grey indicate parts of the timeline that are not visible in the timeline area at the moment. You can change the size of this part by zooming in or out of the timeline (see section "Moving within the Timeline" on page 6-25).
in light grey	Parts in light grey show the part of the timeline that is currently visible in the timeline area. You can change the size of this part by zooming in or out of the timeline. Furthermore, by moving within the timeline you can change its position (see also section "Moving within the Timeline" on page 6-25). This part can be selected directly with the mouse and moved along the scrub bar to switch the view of the video and audio tracks in the timeline area to another part of the timeline.

Items of Scrub Bar	Description
	The blue line indicates the part of the timeline selected via the timeline's in- and outpoint. For information on how to set the in- and outpoint of the timeline see section "Setting an In- and Outpoint for the Timeline" on page 6-28.
	With the scrub bar cursor you can move within your project. Simply select the cursor with the mouse and move it along the scrub bar to the desired position. You can also click on a position outside the visible timeline area on the scrub bar directly to move the cursor and the visible part of the timeline there immediately. Additionally, with a mouse click directly below or above the part of the scrub bar in light grey you can position the scrub bar cursor there instantly.

5.4 Controls

At the bottom of the control area the controls to play out and move within your current project are located.

The **SLAVE** button activates the slave mode of the Edit Tool. With the slave mode the DVS system can be controlled via RS-422 from another workstation, e.g. a VTR or a digital disk recorder such as the Pronto4 by DVS. Then it will behave like a VTR by using preroll, postroll, etc. The specifications of these parameters can be found in section "Slave Mode / RS-422 Control" on page A-19. When the slave mode is activated, the slave mode control window will be displayed on the screen (see section "The Slave Mode Control Window" on page 5-14). To clear the software from the slave mode, press the button **CLOSE** of the window **'Slave mode'**.

This button toggles between the frames or fields display mode. In its deactivated state, the frames of a video clip are displayed when stepping one frame/field backward or forward in the timeline. When activated, its fields will be displayed.

With these buttons you can step one frame/field for- or backward in your project. The timeline cursor will move accordingly. Alternatively, you may use the keyboard shortcuts [Left Arrow]/[Right Arrow] or [3]/[4].

With this button you can play-out the timeline backwards, i.e. it will start a reverse play-out. Once activated, the button changes its appearance to its active state. To stop the reverse play-out you have to click it again. Alternatively, you may use the keyboard shortcut [J] to start a reverse play-out and [Space]/[K]/[Shift + K] to stop it. When increasing or decreasing the speed of the play-out (see section "Keyboard Shortcuts" on page A-6), the current speed (if negative) will be indicated in frames per second (fps) in this button.

With this button you can start a play-out of the timeline. After activation the button changes its appearance to its active state ( ). To stop the play-out you have to click this button again. Alternatively, you may use the keyboard shortcuts [Space]/[5] to start or [Space]/[K]/[Shift + K] to stop a play-out. When increasing or decreasing the speed of the play-out (see section "Keyboard Shortcuts" on page A-6), the current speed (if positive) will be indicated in frames per second (fps) in this button (

).

To view your project on an additionally connected monitor, you have to configure the output format (video raster) of the timeline accordingly (see section "How to Configure the Video Output" on page 6-11).

With this button activated a play-out of the timeline will be performed endlessly in a loop: Once the timeline cursor reaches the outpoint of the timeline, the play-out will start from the inpoint again. To switch off the loop mode deactivate this button.

You can jump to particular points on the timeline, such as cutting/edit points and timeline markers, with these buttons. The first button jumps to the point that is previously located on the timeline while the second button jumps to the next one. Alternatively, you may use the keyboard shortcuts [A] and [S].

This button toggles between the insert and overwrite mode. See section "Insert/Overwrite Mode of the Timeline" on page 6-30.

This button plays around the current position of the timeline cursor (± several sec.) in a loop. To deactivate the loop review press the button **REVIEW** again. The duration of the review can be configured freely with the with the Configuration Tool (see "Fuze Configurations" user guide for more information).

This field shows the current position of the timeline cursor in timecode or frames notation. If you want to move to a certain position on the timeline, you can enter the position in the appropriate format here. After that press [Enter] and the cursor will then move to the entered position. For more information about the timecode/frame number fields and their format see section “About Timecode / Frame Number Fields” on page 2-14.

5.5 The Slave Mode Control Window

The DVS software provides in some of its software modules a slave mode. Usually it can be activated with the button **SLAVE**. Then the following window may be displayed on the screen allowing you to control the respective software module without relinquishing the slave mode:

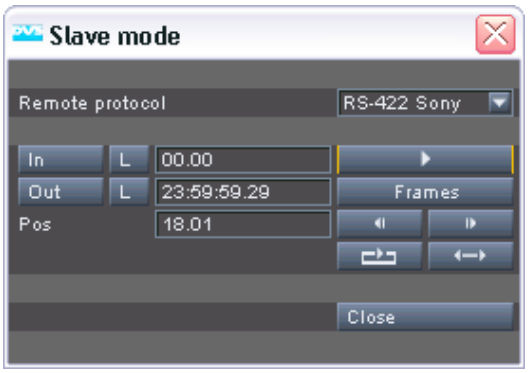


Figure 5-12: Slave mode control

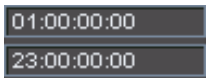
In slave mode the DVS system will behave like a VTR by using preroll, postroll, etc. The specifications of these parameters can be found in section "Slave Mode / RS-422 Control" on page A-19. This section explains the items provided by the **'Slave mode'** window:

For more information about timecode/frame number fields and their format refer to section "About Timecode / Frame Number Fields" on page 2-14.

Select from the **Remote protocol** combo box the RS-422 protocol that should be used to control the DVS system (see also section "Slave Mode / RS-422 Control" on page A-19).

The buttons **IN** and **OUT** enable you to select an in-/outpoint directly from the current position of the timeline cursor. Move the timeline cursor via the **Pos** field (see below) or its controls (see below) to the position that you want to set. Then press the respective button and the entry field to its right will take on the selected position. With an activated in- or outpoint (**L** buttons, see below) these buttons allow you to jump to the in-/outpoint directly.

These buttons activate the in- and outpoint set in their corresponding entry fields to the right.



To position the in- and/or outpoint you can also enter a particular position in the entry fields to the right directly. For an activation of an in-/outpoint you may press [Enter] or use their activation buttons (see above).

On the one hand the **Pos** field indicates the current position of the timeline cursor, for example, during a play-out operation of the Edit Tool's timeline. On the other it can be used to move the timeline cursor by entering a particular position in its entry field (afterwards press [Enter]).

With this button you can play out the contents of the timeline in real time. When a play-out is initiated, it will be displayed in the video overlay of the control area as well as at the video and/or audio outputs of the DVS system. After activation the button changes its appearance to its active state and you have to press it again to stop the play-out.

This button toggles between the frames or fields display mode. In its deactivated state, the frames of a video clip are displayed when stepping one frame/field backward or forward in the timeline. When activated, its fields will be displayed.

With these buttons you can step one video frame/field for- or backwards in the timeline. The **Pos** field will indicate this accordingly.

With this button activated a play-out of the timeline will be performed endlessly in a loop: Once the timeline cursor reaches the outpoint of the timeline, the play-out will start from the inpoint again. To switch off the loop mode simply click this button again.

This button activates the forward-backward play mode of the timeline. In this mode an endless play-out of the timeline will be performed once a play-out is started: When the timeline cursor reaches the outpoint of the timeline, the play-out will be reversed and the timeline is played backwards (speed -1) until the inpoint is reached where the play-out will be performed forward again. To switch off the forward-backward play mode you have to click this button again.

This button deactivates the slave mode and closes the **'Slave mode'** control window.

The Timeline

For the editing process the Edit Tool provides a timeline with video and audio tracks where you can add the clips in the desired sequence as they should be played out in the end. You can then, for instance, define wipes, dissolves or cuts for the material.

This chapter explains how to work with the timeline in detail. It will be discussed how to add clips to the timeline and how to work with them afterwards. The latter will include among others descriptions on how to move in the timeline, how to perform cuts and how to set transitions. Additionally, because the timeline area is the most important part for your work with the Edit Tool, it can be configured freely which will also be addressed here. The chapter will be concluded with a description of how to finalize the timeline.

6.1 Adding Clips to the Timeline

To begin an editing work you have to drag the clips to the video and/or audio tracks of the timeline first. You can add clips of different formats to the timeline because the DVS software works format independent and is capable of handling even high-resolution film material.

You can take a clip directly from the contents area of the bin and add it to the tracks of the timeline. Afterwards the length of the timeline will be indicated in the field directly below the timeline scale (length of the timeline's in- and outpoint, see also section "Setting an In- and Out-point for the Timeline" on page 6-28):

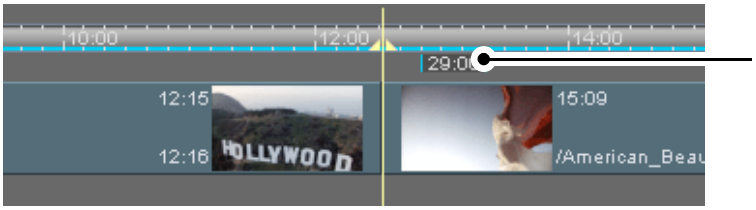


Figure 6-1: Timeline length indicator

During the adding of clips to the timeline, the clip will be visible in the video or audio track of the timeline and it may react to certain elements of the timeline (snapping mode) to allow for an automated positioning. Further information about the snapping mode can be found in section "Moving Clips within the Timeline" on page 6-34.

When adding or moving clips in the timeline, you have to heed the current insert/overwrite mode of the timeline. More information on this can be found in section "Insert/Overwrite Mode of the Timeline" on page 6-30.

To take a clip directly from the contents area of the bin and add it to the tracks of the timeline perform the following:

- If required prepare the clip to be added to the timeline for editing purposes as described in section "Preparing Clips for Editing Purposes" on page 4-20 and section "Changing the Properties of Clips" on page 4-21.
- Then select the clip in the contents area of the bin and drag and drop it with the mouse into a video or audio track.

Video clips can only be dragged to the video track(s) of the Edit Tool and audio clips only to the audio tracks.

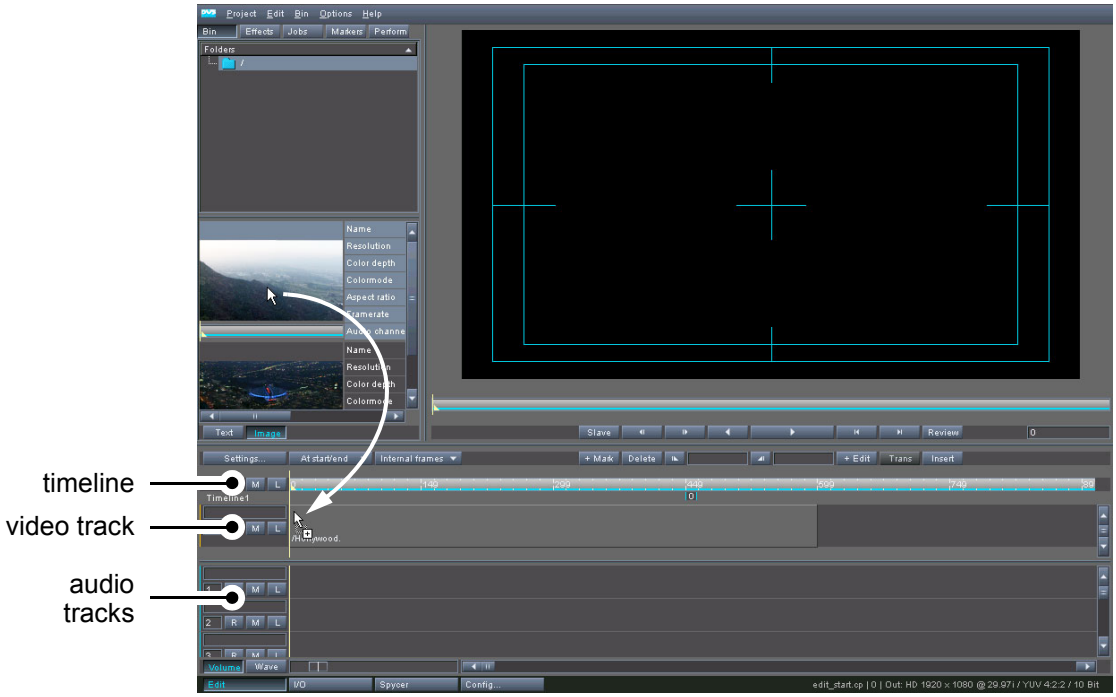


Figure 6-2: Drag and drop of video clip to timeline

Once the mouse button is released, a representation of the clip is added to the timeline.

When using clips from the bin, they are neither removed nor deleted there. They will remain in the bin for future use so that you can add the clip (or other parts of it) to the timeline again.

The clip will be placed at the position of the mouse pointer where the mouse button was released.

After adding a clip to the timeline, a gap may appear. Gaps can be indicated by a red line in the timeline scale. If this occurs, you can move the clip easily to the beginning of the timeline with a double-click of the mouse on the timeline scale (see section “Moving Clips within the Timeline” on page 6-34).

While the starting point of the clip (its position and inpoint) within the timeline is determined during the drag-and-drop procedure by the position of the mouse pointer, its outpoint usually is defined by the length of the clip. You can change these attributes easily after the clip was add-

ed to the timeline as described in section “Changing In- and Outpoints of Timeline Elements” on page 6-43.

If more than one clip is selected for the drag-and-drop procedure, the Edit Tool will either align the clips horizontally in one track of the timeline or put each clip into another track directly below the selected one. This drag-and-drop behavior can be configured with the Configuration Tool (see “Fuze Configurations” user guide).

If you drag an audio clip to the timeline that contains more than one mono or stereo channel (multiple channels), the additional channels will be added to the other audio tracks below the selected one.

6.2 Configuring the Timeline

Because the timeline is the most important part of the Edit Tool, it can be configured freely and thus adapted to your individual needs. For a more comfortable working you can change the layout of the timeline area in various ways. You can also adjust the timeline scale to the needs of your project, e.g. by defining a special offset. Furthermore, you have to define the necessary output format of the timeline, for example, to view your project on a monitor connected to the DVS system or to play out the timeline. All this will be described in the following sections.

Most configurations and settings will be stored together with your project in a project file.

6.2.1 Changing the Layout of the Timeline Area

Because in the timeline area most of the editing work is performed, you can change its layout freely to adapt it to your personal needs for a more comfortable working. The layout of the timeline area can be changed in several ways, for example, by adjusting the size of the video and audio tracks.

Changing the Area Size Manually

You can change the size of the timeline area manually. For this move the upper edge of the timeline area up or down with the mouse to enlarge or reduce the timeline area. The size of the tool and control area together with its video overlay will adjust itself automatically.

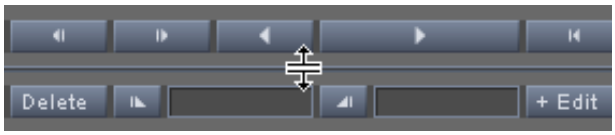


Figure 6-3: Adjusting the size of the timeline area

If you pull the edge completely down, the timeline area can be hidden. You can also pull the edge completely up to hide the tool and control area.

The same way you can adjust the size of the audio track area. Take the edge directly above the audio tracks and move it up or down. If you pull the edge completely down, the audio tracks will be hidden. If you pull it farthest up, you can hide the video track(s).

Video and Audio Track Properties

Via the **SETTINGS...** button you can alter the size and number of video and audio tracks. It is located at the top left side of the timeline area. After pressing this button the **'Timeline output settings'** window is displayed.

At the bottom of this window you can find in the **Options** area further optional settings. To the left you can find settings to alter the size and number of the video and audio tracks in the timeline:

The other items available in the **Options** area are explained in their respective sections (for an overview see section "How to Configure the Video Output" on page 6-11).

Figure 6-4: Track size options

With the fields for the track sizes you can adjust the height of the tracks for video and audio separately. Either change the sizes by selecting one of the preset sizes from the combo boxes to the left (`Small`, `Medium`, `Large`) or enter the pixel height manually in the adjoining entry fields.

Individual track sizes can also be configured for each track in the timeline area manually (see section "Changing Track Sizes Manually" on page 6-7).

Additionally, you can find here to the right entry fields where you can set the amount of audio and video tracks that will be visible in the timeline area.

Tracks can also be added and removed via the context menu of a clip/timeline track (see section "The Context Menu of Video Clips" on page 6-55 and section "The Context Menu of Audio Clips" on page 6-63).

Working with several video tracks vertically in the timeline is different from the usual approach of a horizontal editing in a timeline. Then the different tracks of the timeline form a stack. Further information about this and how to work with vertical editing can be found in section "Vertical Editing of Video Clips in the Timeline" on page 6-59.

Further information about the **'Timeline output settings'** window can be found in section "How to Configure the Video Output" on page 6-11.

Changing Track Sizes Manually

The track sizes can also be manually set in the timeline area. Setting the tracks to individual sizes may be useful in case you want to focus on important tracks or display an audio track with an audio waveform more clearly (see section “Waveform Display” on page 6-66).

The video and audio tracks can be adjusted to an individual height. For this you have to move the bottom line of a track (separation line) in the area right in front of the tracks with the mouse:

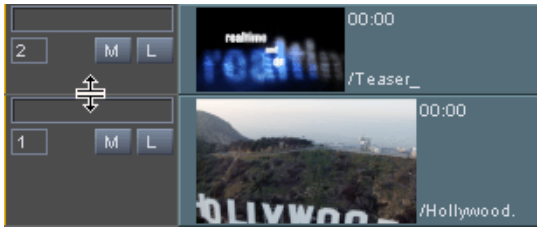


Figure 6-5: Setting track sizes manually

The thumbnails or audio clip features will be scaled accordingly.

6.2.2 Changing the Appearance of Video Clips

To the right of the **SETTINGS...** button you can find the thumbnails combo box. When you click on the arrow to the right of the combo box with the mouse, you will receive a drop-down list:

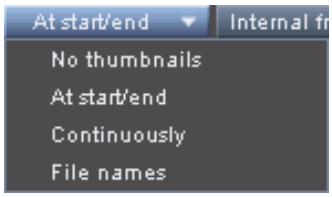


Figure 6-6: List of thumbnails combo box

From this list you can select the view of the video track(s), i.e. you can select the way the clips’ representations are displayed in the video track(s). For example, the clips can be shown with continuous thumbnails in the video track(s):

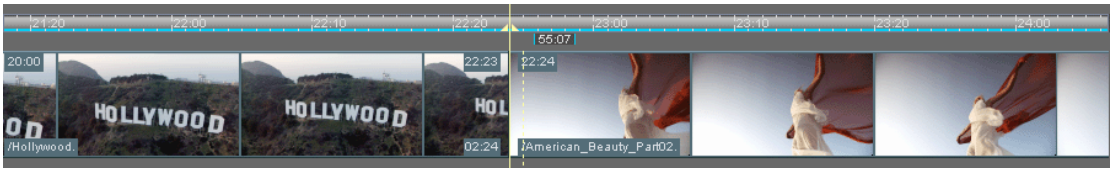


Figure 6-7: Continuous thumbnails

In detail the clips in the video track(s) can be set to the following appearances:

Selection	Meaning
`No thumbnails`	The clips' representations in the video track(s) of the timeline are shown without thumbnails.
`At start/end`	Thumbnails of the clips are displayed at the start and the end of the clips only (e.g. as shown in figure 6-51 on page 6-54).
`Continuously`	All clips in the video track(s) are filled with thumbnails continuously (as shown in the example figure above).
`File names`	Instead of seeing the thumbnails continuously, the clips are filled with their file names instead, i.e. you will see the original file names of the respective image files throughout the clip which may be especially helpful during frame-accurate editing.

6.2.3 Configuring the Timeline Scale

The timeline scale can be adapted to the needs of your project. You can either set a special offset or switch the notation of the scale.

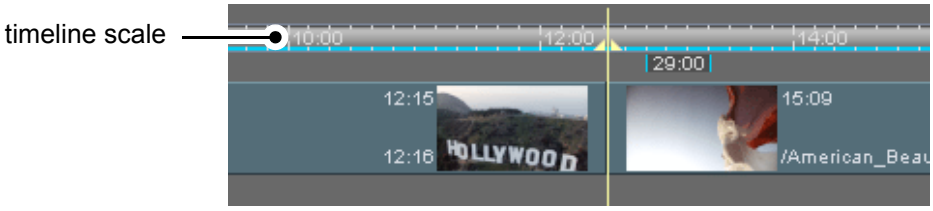


Figure 6-8: The timeline scale

To set a timeline offset, for example, to match the current project with other projects, you have to use the **TC - Offset** item of the output settings window (see section "How to Configure the Video Output" on page 6-11). The timeline of the Edit Tool will then provide this offset.

Additionally, the timeline scale as well as all position and length indicators in the Edit Tool can be switched from a display of the timecode notation to frame numbers and vice versa. Further information about this can be found in section "About Timecode / Frame Number Fields" on page 2-14.

6.2.4 Configuring the Tooltips of Clips

All clips added to the timeline of the Edit Tool, i.e. video as well as audio clips, provide various information via tooltips. These information will be displayed as soon as the mouse cursor is placed over a clip:

Figure 6-9: Tooltip of video clip

Then you can see, for example, the file name of the clip or its in- and outpoint on the timeline. The information displayed via the tooltips can be adjusted freely to your individual needs with the Configuration Tool of the DVS software (see "Fuze Configurations" user guide for more information).

Additionally, you can turn on or off the tooltips of the clips in the timeline. For this call up the context menu on either a video or audio clip and select the menu option ***Enable tooltip*** (see also section "The Context Menu of Video Clips" on page 6-55 or section "The Context Menu of Audio Clips" on page 6-63 for further information).

The tooltips can also be enabled or disabled via the Configuration Tool (see "Fuze Configurations" user guide for more information).

6.2.5 Changing the Display Type

To the right of the thumbnails combo box you can find the display type combo box where you can set the way position information are displayed by clips in the Edit Tool.

The position information of clips are shown, for example, in their text information after they were added to the timeline (top left and top right, see section "The Clip's Information" on page 6-54).

When you select the arrow to the right of the combo box, a drop-down list will be available where you can set the display type:

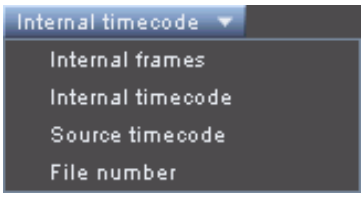


Figure 6-10: List of the display types

From this list select the display type that should be used in the software.

Selection	Meaning
`Internal frames`	The clips show positions according to an internal frame count. This setting also activates the frame notation for the Edit Tool (see section "About Timecode / Frame Number Fields" on page 2-14).
`Internal timecode`	The clips show positions according to an internal timecode count. This setting also activates the timecode notation for the Edit Tool (see section "About Timecode / Frame Number Fields" on page 2-14).
`Source TC`	The clips show positions according to the timecodes provided by their file headers and set either via the Configuration Tool or the clip's properties. If the clips do not provide a source timecode of their own, no timecodes will be displayed by the clips. However, they can be configured to show a virtual source timecode via their properties in the bin. Further information about source timecode can be found in section "Notes on Source Timecode and Keycode" on page 2-12. This setting also activates the timecode notation for the Edit Tool (see section "About Timecode / Frame Number Fields" on page 2-14).
`File number`	The clips show positions according to the numbers of their respective image files, e.g. the image *`Hollywood00231.dpx`* as the starting point of a clip will be shown with `231`. This setting also activates the frame notation for the Edit Tool (see section "About Timecode / Frame Number Fields" on page 2-14).

6.2.6 Configuring the Video and Audio Output

To output video and audio and to view your project's timeline with a monitor connected to the DVS system, you have to configure the output format of the timeline accordingly. Both, the video and audio output, can be configured freely.

How to Configure the Video Output

With the button **SETTINGS...** at the top left side of the timeline area you can determine the output format (video raster) of the project. Additionally you can find here various other settings concerned with the timeline or its output.

In the Edit Tool you can set different video format settings either for the SDI or the DVI and analog outputs. Once set, the respective format(s) will be automatically applied to the output ports of the DVS system. By default the DVI/analog output settings are linked to the video output format of the SDI and, if not configured otherwise, will be set to the same raster.

The selected SDI output raster is applied to the video overlay and it may have an effect on the images displayed there (e.g. they may get cropped). You can use the video overlay to see the effects immediately because it will always show the exact content of the outgoing signal.

After pressing the button **SETTINGS...** the following window will be displayed on the screen:

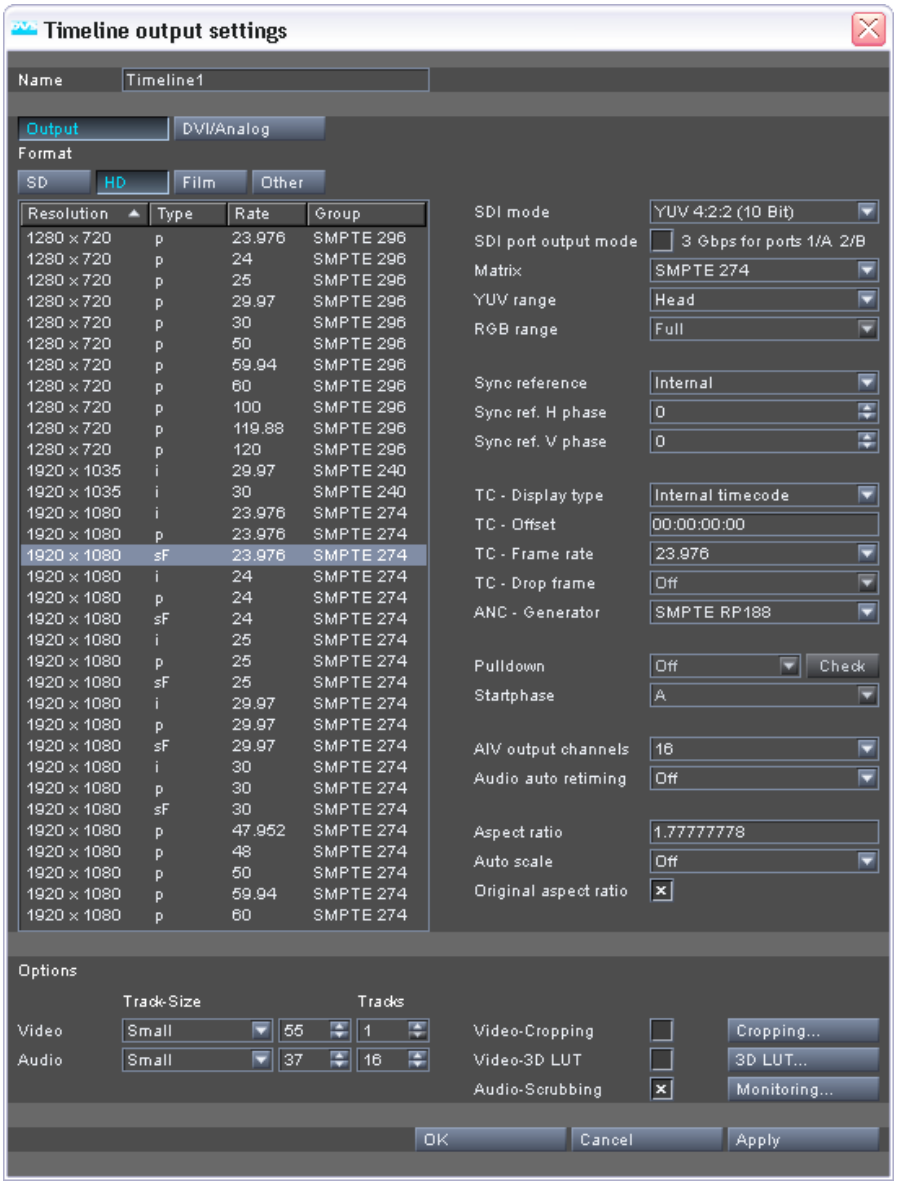


Figure 6-11: Window to set the output settings

As a standard after selecting the video format settings the SDI output configurations are displayed. Use the provided items to set the video format accordingly. In this window you can also set the software to an autoscaling of the material to be played out if its original resolution differs from the configured output raster. Additionally, you can determine here the amount of audio channels that will be embedded in the video signal (AIV). This is provided because some external devices have difficulties when handling embedded audio that provides more than four audio channels.

With the tabs at the very top you can set the output format for the different ports. The output video format can be set separately for the SDI and the DVI/analog outputs. The settings items of the tab **DVI/Analog** will be available once the check box **Lock to Output** is deactivated.

As soon as you confirm your settings with the **OK** button, they will be in effect. The in- and outputs of the system (except the SD outputs) will change their format respectively. Depending on the selected video format for SDI the video overlay of the Edit Tool may change its aspect ratio (16:9, 4:3, et al.). In the Configuration Tool (see "Fuze Configurations" user guide) you can configure the SD outputs as well as set an output raster that the DVS software should use as the default raster after starting a new project.

Rasters for film not included in the SDI standard (i.e. 2K with 20 Hz or more) are output via the analog and DVI outputs only.

In the **'Timeline output settings'** window you have further configuration possibilities at hand via the **Options** area at the bottom of the window. There you can configure the following:

- The video and audio track sizes as well as the number of tracks (see section "Changing the Layout of the Timeline Area" on page 6-5).
- The analog audio outputs to monitor audio during your editing work (see section "Further Audio Configurations" on page 6-16).
- A 3D LUT file to be used for the timeline (optionally available, see section "Loading and Applying a 3D LUT File" on page 6-17).
- A cropping for the whole timeline (see section "Cropping the Timeline" on page 6-20).
-

The rest of the available items in this window, i.e. the items of the areas **Name** and **Format**, are described in more detail in the "Fuze Configurations" user guide.

How to Configure the Audio Output

The timeline area contains several audio tracks where you can add audio clips in the desired sequence and set fade-ins and -outs. To output audio via the digital audio outputs of the DVS system you have to configure the audio output accordingly.

The number of audio tracks displayed in the Edit Tool can be set to your liking (see section "Video and Audio Track Properties" on page 6-6).

In the areas preceding the audio tracks you can find the audio routing button **R**:

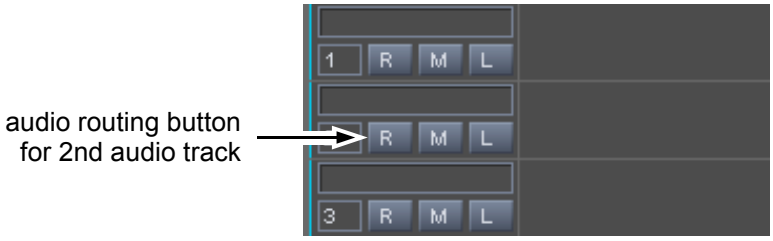


Figure 6-12: Button to configure the audio output settings

With these buttons you can set for each track separately the audio output. After pressing one of the **R** buttons the following window will be displayed:

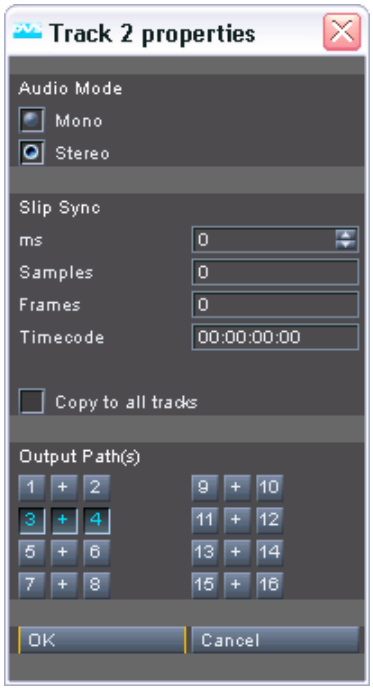


Figure 6-13: Window to configure the audio output settings

In the area **Audio Mode** select whether the audio mode of the track should be mono or stereo. The Edit Tool applies the selected audio mode directly to the respective audio track and it will be down- or up-mixed before it reaches any output.

While the smallest unit of a video clip is a single frame/field, the smallest unit of an audio clip is a sample. The DVS system provides up to 48,000 samples per second of audio (48 kHz) opposed to the respective video frequency setting (frames per second) for the video output. With the area **Slip Sync** you can bring your video and audio output into synchronization by adjusting the audio offset. For this the area provides different settings items where you can specify the positive or negative offset value either in milliseconds, samples, frames, or via a timecode. If you adjust one setting, the other ones will be set accord-

ingly. With the check box **Copy to all tracks** the adjusted offset can be transferred to all other available audio tracks easily: Simply enable the check box and confirm your setting with the **OK** button to copy the synchronization settings to all audio tracks.

In the area **Output Path(s)** you can see the different digital audio channels that the DVS system provides. With a click on the respective button select the digital audio channel(s) that should be used for the output. An activated **+** button between two channels configures the two channels to stereo.

With the settings of the area **Audio Mode** and the ones of the area **Output Path(s)** you can mix the audio signals of your project according to your needs:

– If the audio clip in the timeline is in mono, it does not matter whether the audio track is set to stereo or mono. The output on all selected channels will be the same, i.e. the mono audio clip as it is available in the timeline.

Audio Clip	Audio Track	Output
Mono	Mono	Mono of clip
Mono	Stereo	Mono of clip

If the audio clip is in mono, the settings for the track's audio mode and the channel's **+** button provide, of course, no function regardless of their setting.

– If the audio clip in the timeline is in stereo and the audio track is configured to mono, the clip will be downmixed by the Edit Tool. On all selected channels you will receive the same signal.

Audio Clip	Audio Track	Output	
		Channel A	Channel B
Stereo	Mono	Mono of stereo clip	Mono of stereo clip

– If the audio clip in the timeline is in stereo and the audio track is configured to stereo, the output will depend on the state of the **+** button, i.e. whether the channels are configured as stereo or mono channels: When the channels are set to mono, a mono signal

of the downmixed stereo clip will be provided. If the channels are set to stereo, a standard stereo signal will be output.

Audio Clip	Audio Track	Output		
		+ Button	Channel A	Channel B
Stereo	Stereo	Mono (button deactivated)	Mono of stereo clip	Mono of stereo clip
Stereo	Stereo	Stereo (button activated)	Channel 1 (left) of stereo clip	Channel 2 (right) of stereo clip

Once the settings for the respective track are set, confirm and activate them with the button **OK** of the audio track properties window.

Audio will be given out via AES/EBU and embedded in the video signal simultaneously.

Via the **SETTINGS...** button in the timeline area of the Edit Tool (see section "How to Configure the Video Output" on page 6-11) you can configure the analog audio outputs (see section "Further Audio Configurations" on page 6-16) and the maximum amount of audio channels that will be embedded in the video signal.

6.2.7 Further Audio Configurations

Via the **SETTINGS...** button you can configure the analog audio outputs to monitor audio during your work with the software. It is located at the top left side of the timeline area. After pressing this button the **'Timeline output settings'** window is displayed.

At the bottom of this window you can find the **Options** area where further optional settings are provided. To the right you can find the settings items for a further configuration of audio:

The other items available in the **Options** area are explained in their respective sections (for an overview see section "How to Configure the Video Output" on page 6-11).

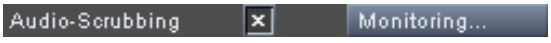


Figure 6-14: Items for a further configuration of audio

In detail this area provides the following items:

Audio Scrubbing — If this check box is activated, the contents of the audio tracks will be given out during a scrubbing of the Edit Tool's timeline, for example, when making a fast shuttle operation with the mouse. Then the audio signal resembles and imitates a fast shuttle operation of a VTR.

MONITORING... — The button **MONITORING...** configures the analog audio outputs of the DVS system. A click on this button opens the following window:

Figure 6-15: Analog audio configuration

The settings **Output A** and **Output B** configure the first and second analog monitoring output of the DVS system respectively. Select from the combo boxes the audio channels that should be given out at the respective analog output.

Once everything is set as desired, the audio configuration is complete and you can monitor the audio output as configured via the analog and digital audio outputs of the DVS system.

6.2.8 Loading and Applying a 3D LUT File

With a three-dimensional look-up table (3D LUT) file you can, for example, simulate the typical look of a projected motion picture film on a monitor connected to the digital video interfaces of the DVS system. The Edit Tool supports 3D look-up tables from various suppliers, such as ARRI or Kodak. To apply a 3D LUT you have to load its file first and create a profile for it. Afterwards the loaded 3D LUT file has to be enabled for the DVS software.

The 3D LUT support of the DVS software is an optional feature. Depending on the configuration of your DVS system it may not be available.

Via the **SETTINGS...** button you can access the items to load a 3D LUT file into the Edit Tool. It is located at the

top left side of the timeline area. After pressing this button the **'Timeline output settings'** window is displayed.

At the bottom of this window you can find the **Options** area where further optional settings are provided. To the right you can find the settings items to load a 3D LUT file:

The other items available in the **Options** area are explained in their respective sections (for an overview see section "How to Configure the Video Output" on page 6-11).

Figure 6-16: Items to load a 3D LUT file

After clicking on the button **3D LUT...** a window opens to load a 3D LUT file and create a profile for it:

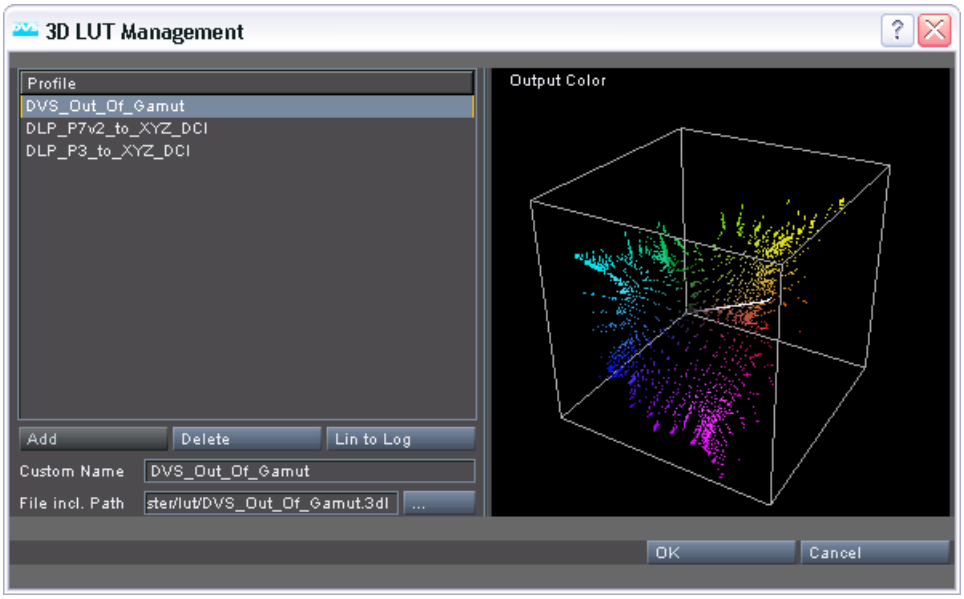


Figure 6-17: 3D LUT file management

To load and administer available 3D LUT files the window provides the following items:

Several sample LUT files are delivered with the DVS software. They can be found in the directory `lut` of the software's installation path (default: `C:\Program Files (x86)\DVS\Clipster`).

More detailed information about 3D LUT files can be found in section "3D LUT Files" on page A-15.

Profile

In the list box **Profile** you can see a list of the already specified 3D LUT file profiles. Each entry in this box represents one 3D LUT file. Select from this list box one entry, for instance, to change its settings, to delete it or to enable it.

ADD

Once a valid 3D LUT file is selected and a profile name is specified, you can add it to the list box above with the button **ADD**. Because one 3D LUT file can be applied to one profile only, with this button you can also change the name of an already created profile or assign another file to it.

DELETE

With the button **DELETE** you can delete an already specified 3D LUT file profile from the list box. Simply select an entry from the list box and press this button to delete it.

LIN TO LOG

Logarithmic 3D LUTs often expect logarithmic material in the timeline (color values for each image are stored logarithmically). With this button it is possible to virtually convert linear material in the timeline to a logarithmic color space before the 3D LUT is applied.

Custom Name

In the entry field **Custom Name** you can state the name of a 3D LUT profile. Either enter a new name or select an already created profile in the list box and change its name.

File incl. Path

In this entry field you have to enter the directory path and file name of the 3D LUT file. You may also click on the button to the right of the entry field ( ) to select the file directly via the opening dialog window.

3D LUT Visualization

When a profile is selected from the list box, its 3D LUT file will be displayed in the preview area to the right in a color cube. Then you can view it in more detail by performing one of the following on the color cube:

- By pressing the left mouse button and moving the mouse you can rotate the color cube.
- By clicking with the scroll wheel or the right mouse button you can switch the output colors to the input colors and vice versa. The one currently displayed will be indicated at the top of the preview area.
- By turning the scroll wheel of the mouse you can morph the colors in the cube from output to input and vice versa. The degree of the morphing will be indicated at the top of the preview area.

Once at least one profile is available in the list box, you can enable it for the Edit Tool. For this the desired profile name has to be selected from the list box and your selection has to be confirmed with the **OK** button. The button **CANCEL** it will close the window for the 3D LUT management without confirming any of the alterations.

Nevertheless, the selected 3D LUT profile and file will be in effect for the timeline only if the check box **Video-3D LUT** is activated which is available in the **Options** area of the **'Timeline output settings'** window:

Figure 6-18: Activation of the 3D LUT profile

Then the selected profile and its 3D LUT file will be applied to the material in the timeline of the Edit Tool.

6.2.9 Cropping the Timeline

Via the **SETTINGS...** button you can crop the contents of the timeline, for example, if you need black bars in the video output (letter- or pillarboxing). The button is located at the top left side of the timeline area and after pressing it the **'Timeline output settings'** window is displayed on the screen.

At the bottom of this window you can find further optional settings in the **Options** area. To the right you can find the settings to crop the video output:

The other items available in the **Options** area are explained in their respective sections (for an overview see section "How to Configure the Video Output" on page 6-11).

Figure 6-19: Items to crop the timeline

With these items you can adjust and crop the output image, for example, to add black bars to your video output. A click on the button **CROPPING...** opens the following settings window:

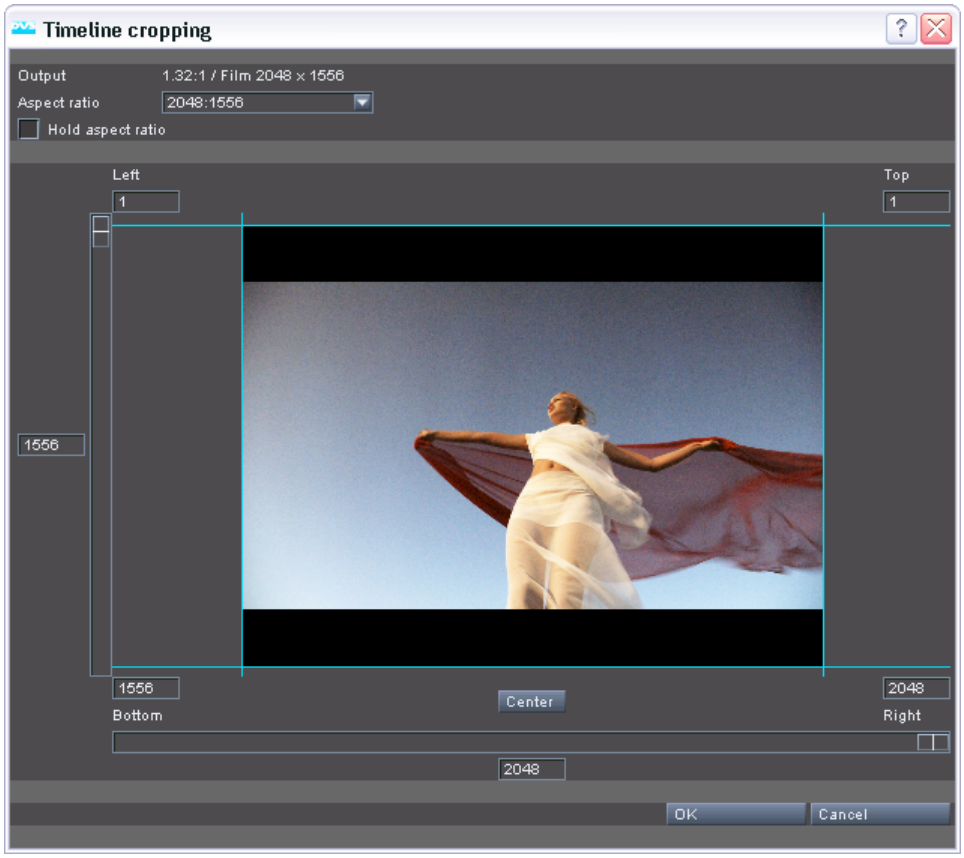


Figure 6-20: Window to crop the video output

During configuring, the cropping will appear in the video overlay and at the video output of the DVS system. However, this is temporary and for monitoring reasons only. To apply the settings to the timeline the cropping has to be activated with the check box **Video-Cropping** in the **Options** area of the **'Timeline output settings'** window (see below).

At the top of the **'Timeline cropping'** window you can find items to control the aspect ratio of the cropped image.

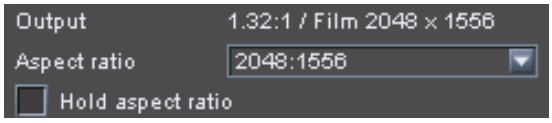


Figure 6-21: Aspect ratio controls

The **Output** information at the top provides you with details about the currently set video format and its aspect ratio. Directly below it you can find the **Aspect ratio** combo box where you can either select one of the predefined aspect ratios from the provided list or simply enter the desired ratio in the field of the combo box directly. You can enter the aspect ratio in any format you like either by typing in a floating point number or its original division formula. The cropping will be applied to the video output representation, the video overlay as well as to the video output directly as soon as a predefined aspect ratio is selected or a typed in value is confirmed by pressing the [Enter] key.

Notation:	Floating point or division (`x:y`)
Examples:	`1.77777778`
	`16:9`

With the **Hold aspect ratio** check box you can lock the aspect ratio selected with the combo box above. Then, when changes are applied manually to the cropping (e.g. via the entry fields or the sliders), the chosen aspect ratio will be maintained.

In the middle of the window you can find a representation of your current video output. With the items provided by and positioned around the image you can change the cropping manually:

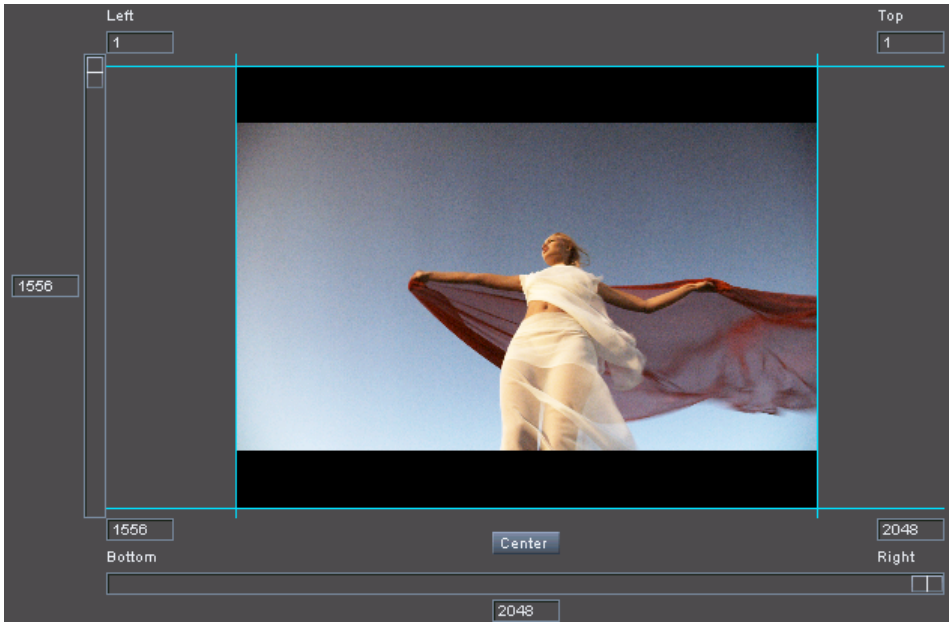


Figure 6-22: Manual controls of cropping

To change the cropping manually use, for example, the entry fields and type in the desired values (in pixels). The cropping will be applied to the representation as well as to your video output as soon as a value is confirmed by pressing the [Enter] key.

You may also use the sliders at the bottom and to the left to change the cropping. Furthermore, you can select the cropping borders as well as the cropped image to adjust the cropping manually. The sliders as well as the entry fields and, if applicable, the aspect ratio will be altered accordingly:

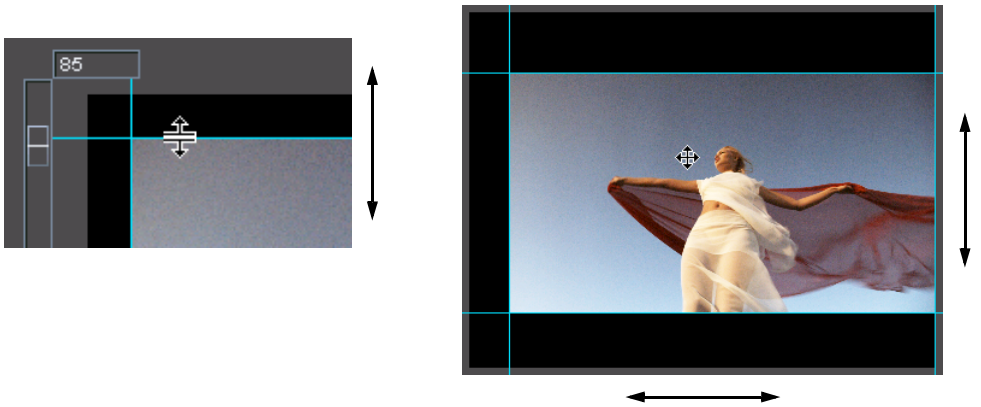


Figure 6-23: Adjusting the cropping manually with the mouse

The button **CENTER** is a toggle button. Once activated, the cropped image will be centered in the representation and locked there. With this, when changes are applied to the cropping, the cropped part will always stay in the middle of the image.

Once everything is set as desired, confirm your selection with the **OK** button at the bottom of the **'Timeline cropping'** window. The button **CANCEL** will close the window for the cropping settings without confirming any of the alterations.

However, the cropping will be in effect for the timeline only if the check box **Video-Cropping** in the **Options** area of the **'Timeline output settings'** window is activated:

Figure 6-24: Activation of the cropping of the timeline

Then the configured cropping will be applied to the whole timeline of the Edit Tool.

The color value of the black bars added to the timeline via cropping and played out via the DVS system depends on the setting for the color space range specified in the video output settings. Via the color space range settings you determine whether this value is given out in a restricted (e.g. with a value of 16, setting: `Head`) or in a full value range (with a value of 0, setting: `Full`). Further information about color space ranges and how to set them can be found in the "Fuze Configurations" user guide.

6.2.10 Naming Tracks

When working with a lot of timeline tracks, each can be given a name of its own to distinguish between them more easily. For this simply type in in the entry field right above the buttons a name. You can give track names to all tracks available in the timeline area:

Figure 6-25: Example of audio track names

Due to the fact that the area preceding each track will always be visible in the timeline area of the Edit Tool, it may help you to identify individual tracks more easily.

6.3 Controlling the Timeline

Most work is performed in the timeline of the Edit Tool directly. In the timeline you can arrange the sequence of video clips, cut the material or set transitions and other operators for the clips. Furthermore, you can play out the timeline, either the whole timeline or a defined range of the timeline.

This section explains in detail how to control the timeline. Among others it will be explained how to move within the timeline and how to set an in- and outpoint for the timeline to play out or finalize the selected range only.

6.3.1 Moving within the Timeline

The Edit Tool provides two representations of the timeline in its user interface: There is the timeline with timeline scale and audio and video tracks in the timeline area, and there is a scrub bar of the timeline in the control area of the Edit Tool. Both can be used to move within your project. Nevertheless, other functions and items to move inside the timeline are provided by the Edit Tool as well.

All ways to move in the timeline are explained in the following.

Moving via the Timeline Scale

With the timeline scale you can move within your project and position the timeline cursor.

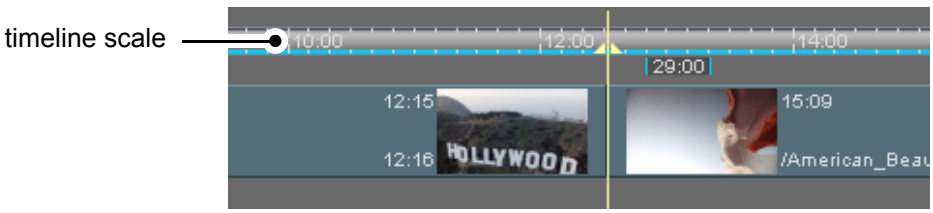


Figure 6-26: The timeline scale

To move within your project click on a point in the scale and the timeline cursor will be positioned there. Additionally, by selecting the cursor and moving it to the left or right you can scrub the visible part of the timeline.

This part of the timeline together with the video and audio tracks can be scaled from a full view of the timeline to a partial view that consists of a few frames only. Via the sliders below the audio tracks in the timeline area you can change the view of the timeline and thus move easily within your project:

Figure 6-27: Timeline sliders

With the left slider you can zoom in or out of the timeline (keyboard shortcuts [Up Arrow] and [Down Arrow]). If the slider is set to the left-most point, you are able to see the whole contents of the timeline. When it is set more to the right, you will zoom into the timeline.

When you have zoomed into the timeline, you can change the viewing position of the timeline with the right slider. You can go to the end of the timeline by pulling this slider to the right, and to the beginning of the timeline by pulling it to the left.

Via the Configuration Tool (see "Fuze Configurations" user guide) you can set the way the Edit Tool performs a zooming on the timeline. There you can set whether the zooming should occur on the position of the timeline cursor or on the current viewing position of the timeline.

The cursor of the timeline provides a special feature when zoomed far into the timeline: Then it provides a frame-end marker which indicates where this particular image ends in the timeline.

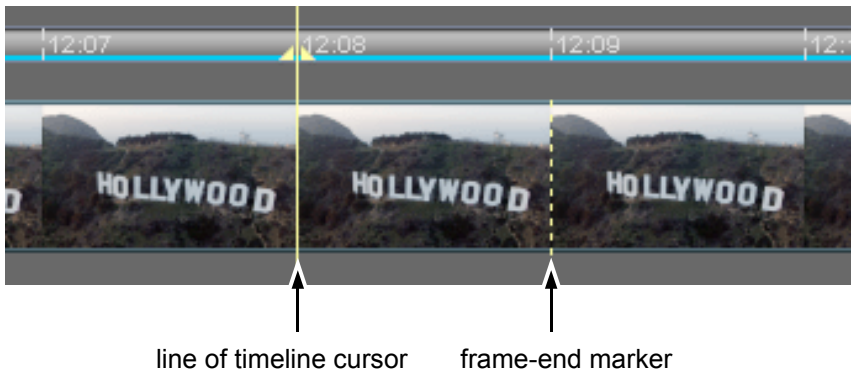


Figure 6-28: Timeline cursor when zoomed into the timeline

As you can see in the figure above the frame selected with the cursor is the 8th frame of the 12th second and it ends where the 9th frame starts. The frame-end marker is very useful when you want to perform frame accurate cuts or other edit works.

Moving via the Scrub Bar of the Control Area

In contrast to the timeline of the timeline area the scrub bar of the control area always shows the complete timeline of the loaded project. It can also be used to move within your project:

Figure 6-29: The scrub bar

There are several ways to move within your project with the scrub bar of the control area:

- Select the scrub bar cursor ( ) with the mouse and move it to the left or right to the desired position.
- Click anywhere below or above the scrub bar to position the scrub bar cursor there instantly.
- Click on a position on the scrub bar outside the visible part of the timeline to move the scrub bar cursor there instantly.
- You can also move the visible part of the timeline on the scrub bar to the left or right with the mouse to select another part of the timeline in the timeline area for viewing.

Further information about the scrub bar can be found in section “The Scrub Bar of the Control Area” on page 5-9.

Other Ways to Move within the Timeline

For a frame accurate moving or to play out and review the timeline you may use the controls of the control area of the Edit Tool. With them you can jump to cutting points and timeline markers or step one frame for- or backward. They are in detail described in section “Controls” on page 5-11.

Of course, via a play-out you can also move within the timeline. There are several ways to play out the timeline:

- You can play out the whole timeline,
- you can review a part of the timeline, and
- you can play out a part of the timeline.

The first two are also initiated via their respective controls of the Edit Tool (the play and **REVIEW** button). However, to play out a defined part of the timeline only, you have to set an in- and outpoint for the timeline. How to do this is described in section "Setting an In- and Outpoint for the Timeline" on page 6-28. Once they are set, you can initiate a play-out of the defined range with the play button of the controls (see section "Controls" on page 5-11).

In addition to the controls of the user interface, there are a lot of keyboard shortcuts available. These complement the controls (some of them even do not have a control element in the user interface) and you can use them for a faster working with the software. A list of all keyboard shortcuts can be found in section "Keyboard Shortcuts" on page A-6.

6.3.2 Setting an In- and Outpoint for the Timeline

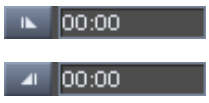
With the button to the left of the button **DELETE** displaying **IN/OUT** you can set an in- and outpoint for the timeline. A play-out or finalizing (if set accordingly) will then be performed in the defined range between in- and outpoint only.

The way the timeline is played out can be configured with the Configuration Tool (see "Fuze Configurations" user guide for more information). The way a finalizing is performed can be configured during the setup of the finalizing process (see section "Finalizing the Timeline" on page 6-68).

When this button is labeled **IN/OUT**, you can set the timeline's in- and outpoint.

The **DELETE** button is a toggle button. If it is activated ( ), you can delete the in- and/or outpoint by clicking the inpoint, outpoint or duration button. Regardless of the position of the timeline cursor the in-/outpoint will be deleted.

If the **DELETE** button is deactivated, a click on the in-/outpoint/duration button will set the inpoint or outpoint respectively.



To position the in- and outpoint frame accurately you may use the in- and outpoint entry fields. Simply type in in the entry fields the position of the in-/outpoint that should be set. Then press [Enter] to confirm it. The in- or outpoint will be set accordingly. Further information about timecode and frame number entry fields can be found in section "About Timecode / Frame Number Fields" on page 2-14.

The inpoint button sets or deletes the inpoint of the timeline depending on the state of the **DELETE** button. When setting, the inpoint will be set at the position of the timeline cursor.

Same as the inpoint button but sets or deletes the outpoint.

When an inpoint is set, you can use this entry field to specify the duration for the timeline. The outpoint will be set accordingly.

This button will be available when the **DELETE** button is activated. Then it will delete both the in- and outpoint simultaneously.

The length of the currently selected range will be indicated in the field directly below the timeline scale:

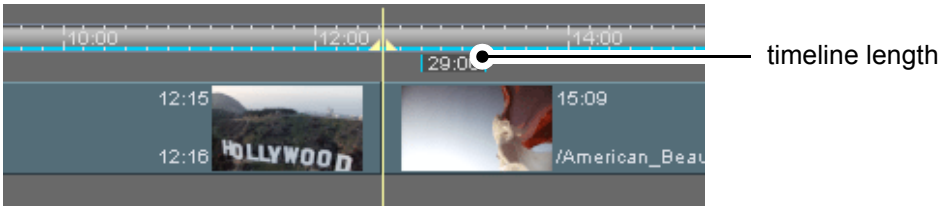


Figure 6-30: Timeline length indicator

Setting an In-/Outpoint

To set an in-/outpoint perform the following:

- Move the timeline cursor via its controls or manually (see section "Moving within the Timeline" on page 6-25) to the position where the in-/outpoint should be set.
- Press the in- or outpoint button ().

An in-/outpoint can only be defined once. If you set it anew, the previous one will be replaced.

To set an in- or outpoint you may also use the entry fields to the right of the buttons.

The in-/outpoint will be set at this position. The still selected part of the timeline will be displayed as usual whereas the deselected part is shown in a dimmed fashion in the video and audio tracks. Furthermore, in the timeline scale the selected part of the timeline will be marked with a blue line:

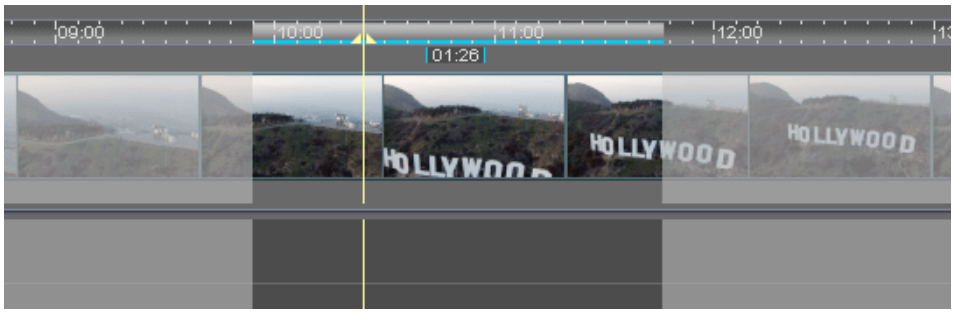


Figure 6-31: Timeline with set in- and outpoint

With a set in- and outpoint a play-out of the timeline will then be performed between in- and outpoint only if set accordingly via the Configuration Tool (see "Fuze Configurations" user guide).

Deleting an In-/Outpoint

To delete an in-/outpoint perform the following:

- Press the button **DELETE** to activate the deletion mode for the in- and outpoint.
- Click the in-/outpoint button ( ) or the duration button ( ) to delete both simultaneously.

The in-/outpoint will be deleted. If both are deleted, the whole timeline will be available again for a play-out.

6.3.3 Insert/Overwrite Mode of the Timeline

The **INSERT** button toggles between the insert and overwrite mode of the Edit Tool.

Insert Mode

In the insert mode, a moved or added clip is inserted between the video material already present in the timeline. The video material behind the insertion point is moved backward from its position

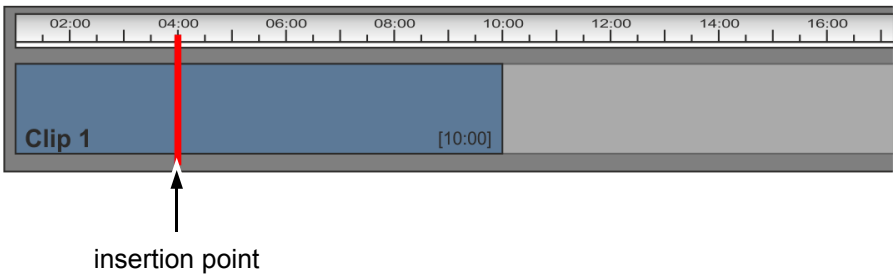
on the timeline. In the insert mode no video material will be overwritten and intact (undivided) clips will be divided at the insertion point.

To set a transition in the insert mode there must be enough head and tail available, otherwise the **TRANS** button will not be available. For more information about transitions see section "Setting Transitions" on page 6-40.

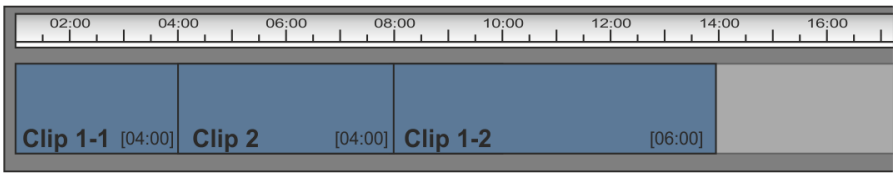
When working with attached clips in the timeline, the overwrite mode is activated automatically. Then you cannot switch to the insert mode anymore. Further information about this and the attachment of clips can be found in section "Attaching Audio Clips to Video Clips" on page 6-49.

Example:

With the insert mode activated add a clip from the bin to the timeline or move a clip to the middle of an intact clip:



The result will be that clip no. 1 gets divided at the insertion point: The added clip no. 2 will be placed here while the rest of clip no. 1 moves to the end of clip no. 2:



The gist of the insert mode is that the contents of the timeline will be preserved at all times and that no clips will be deleted. Furthermore, during your editing work the clips will always stay in connection with previous or following clips so that no gaps will occur in the timeline.

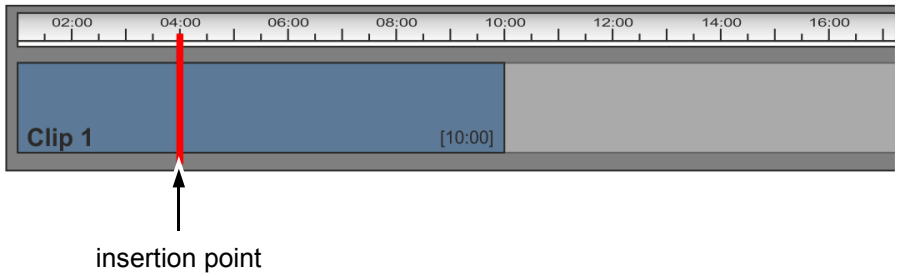
Overwrite Mode

In the overwrite mode a moved or added clip replaces the video material behind the insertion point.

In the overwrite mode you can set a transition between two neighboring clips at all times. If needed, the Edit Tool will create the necessary head and tail automatically. This means that parts of the clips may be moved to enable the transition which, in turn, may cause gaps in the timeline. For more information about transitions see section "Setting Transitions" on page 6-40.

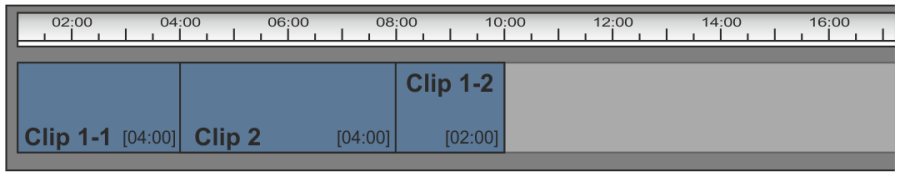
Example:

With the overwrite mode activated add a clip from the bin to the timeline or move a clip to the middle of an intact clip:



insertion point

The result will be that clip no. 1 gets divided at the insertion point: The added clip no. 2 will be placed here while the rest of clip no. 1 is overwritten:



When moving or adding clips in the timeline with the overwrite mode activated, gaps may occur in the timeline. Further information about gaps and how to close them can be found in section "Moving Clips within the Timeline" on page 6-34.

6.3.4 Muting and Locking Tracks

The video and audio tracks of the Edit Tool can be muted and/or locked independently, i.e. they can be enabled or disabled for a play-out as well as for an editing work. If a track is muted, its content will not be played out; if it is locked, no editing work, such as a cutting of clips, can be performed in this track.

To lock or mute a track you have to use the buttons available in the areas right in front of the tracks. The button **M** mutes the track (bar it

from an output), while the button **L** locks it (bar it from an editing work):

Figure 6-32: Buttons to lock and mute tracks

With the **M** and **L** buttons to the left side of the timeline scale you can mute and lock all video and audio tracks with one click (master mute/lock). Afterwards you may use the mute and lock buttons of individual tracks to enable them for the respective work again. This may be especially useful when working with a lot of tracks.

When locking tracks and thus preserving them from changes, the locked tracks will appear dimmed in the timeline area.

6.4 Working with the Timeline in General

After adding clips to the timeline (see section “Adding Clips to the Timeline” on page 6-2), you can begin your editing work by, for example, altering the sequence of clips, cutting clips or defining transitions.

To view your work on an additionally connected monitor, you have to configure the output format of the timeline accordingly (see section “How to Configure the Video Output” on page 6-11).

Performing editing work on clips in the timeline of the Edit Tool is very easy because most editing functions are immediately at hand where they are needed most. For example, the transition properties can be accessed directly from its visible part in a video track.

You can use the video overlay of the Edit Tool to monitor and check the progress of your work. The output effect can be seen in the video overlay instantly. For example, clips of different sizes in the video track(s) of the timeline may be cropped, stretched or compressed, or scaled according to your settings for the respective clips and your output settings. All these effects can be viewed instantaneously via the video overlay of the control area.

The DVS software uses only representations of the original material on the storage for the clips in the bin and the timeline. All editing tasks are performed virtually and at all times your original material will never be altered.

This section describes how to work with the timeline of the Edit Tool in general.

6.4.1 Moving Clips within the Timeline

To arrange the clips in the desired sequence on the timeline as they should be played out in the end, you may have to move clips within the timeline which is very easy with the Edit Tool. Simply select a clip and drag it with the mouse to the desired position on the timeline.

Although the following is shown with video clips, the same applies to audio clips as well.

Alternatively, clips can also be moved with the keyboard (see section “Keyboard Shortcuts” on page A-6).

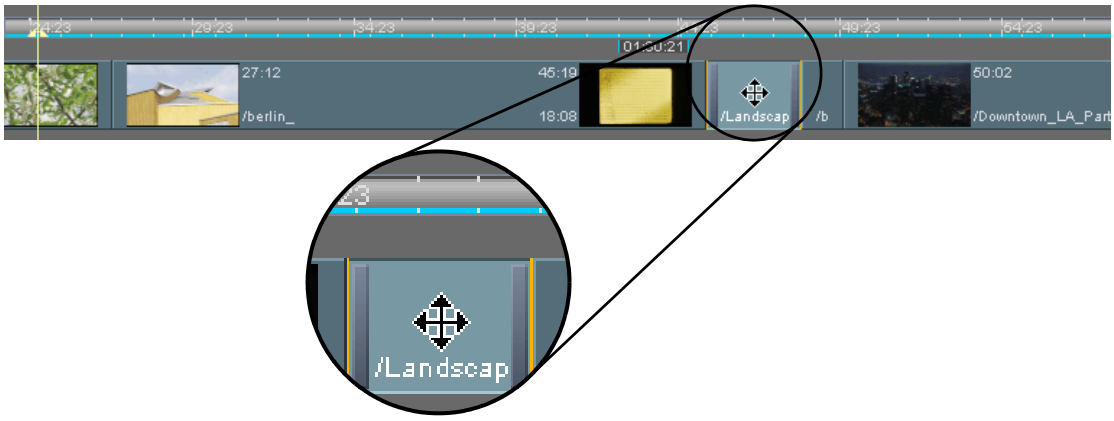


Figure 6-33: Moving a clip

With the insert mode activated, if a clip is moved to a cutting point, the clip will be inserted there while the rest of the material moves backwards in the timeline. If it is dropped in the middle of another clip, this clip will be divided and its rest as well as the rest of the track's contents will be moved to the end of the inserted clip.

This behavior depends on the selected mode of the timeline. With the overwrite mode activated, the moved clip will overwrite the contents of the track from the point of the insertion on. See section "Insert/Overwrite Mode of the Timeline" on page 6-30 for more details.

When the moved clip comes close to certain elements of the timeline, it will automatically snap and position itself to these elements. This is called the snapping mode of the Edit Tool. It makes an easy positioning of elements possible. The moved clip will react to the following elements:

- Starting point of timeline
- Start and end points of timeline elements (e.g. clips and transitions)
- The position of the timeline cursor
- Set in- and outpoint of the timeline

You can disable the snapping mode and activate a fine tuning mode by pressing the [Shift] key.

In the overwrite mode when moving clips or performing other work, gaps may occur in the timeline. A gap means that a clip is no longer in connection with previous or following clips in the timeline. When neither audio nor video is available to output in this part of the timeline, the gap will also be marked with a red line in the timeline scale:

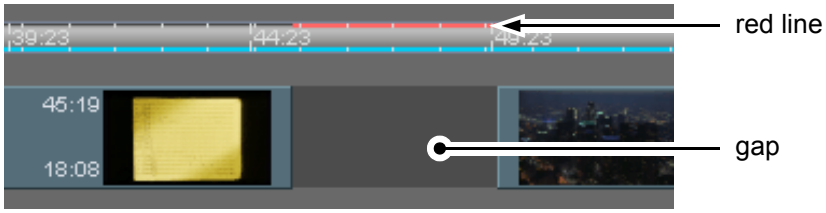


Figure 6-34: A gap in the timeline

To resolve a gap that is present in the timeline you either have to move the clips accordingly or fill the gap by adding another clip (see section "Adding Clips of a Certain Length to the Timeline" on page 6-37).

Additionally, when a red line is shown, you have the possibility at hand to close the gap automatically: When positioning the mouse cursor over the red line of the timeline scale it will change its appearance to a hand and you can close it with a double-click of the mouse.

The starting point of a gap as well as its end are recognized by the Edit Tool as cutting points. Thus, you can move frame accurately to gaps easily via the control buttons that jump to cutting points (see section "Controls" on page 5-11).

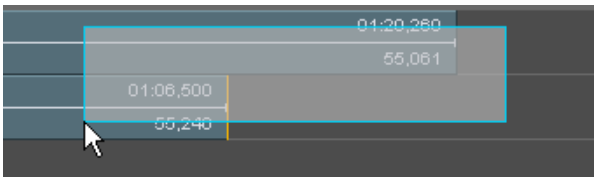
6.4.2 Selecting Clips

Clips can be selected or deselected in the timeline easily. For this perform one of the following procedures or their combination:

Although the table below describes how to select clips only, most procedures can be used to deselect clips as well.

Some of the following procedures are restricted to their type of track, i.e. restricted to either video or audio tracks.

Individual clips	Individual clips can be selected with a click of the mouse on the respective clip.
Several clips	Several clips can be selected disjointedly when clicking them while holding down the [Ctrl] key at the same time.

Range of clips	A range of adjoining clips can be selected by clicking one clip (the starting clip) and afterwards holding down the [Shift] key while clicking the clip that marks the end of the range.
	You can also select a range of clips by drawing a rectangle with the mouse over the clips that you want to select. The starting point of the rectangle has to be on an empty part of the timeline track.  *Figure 6-35: Drawing a selection rectangle*
All clips	All clips in the timeline area can be selected in one step by using the menu option ***Select all*** of a timeline track's context menu.

6.4.3 Cutting, Copying or Pasting Clips

Bin clips and timeline elements can be cut or copied to the clipboard of the operating system and afterwards pasted again at the location of your choice. Further information about this can be found in section "Cutting, Copying or Pasting Clips" on page 4-18.

6.4.4 Adding Clips of a Certain Length to the Timeline

If you want to fill a gap in the timeline or fill a particular part of the timeline with other video or audio material, you can add a clip to the timeline with the help of the timeline's in- and outpoint (3-point editing). This will then fill the selected, particular part of the timeline.

To add a clip of a certain length to a particular part of the timeline perform the following:

- Set the inpoint of the timeline at the position where the clip to be added should start (see section "Setting an In- and Outpoint for the Timeline" on page 6-28).
- Set the outpoint of the timeline at the position where the clip to be added should end (see section "Setting an In- and Outpoint for the Timeline" on page 6-28).

- Next prepare the clip to be added to the timeline as indicated in section "Adding Clips to the Timeline" on page 6-2, for example, by determining its inpoint.

For the next step you have to observe the insert/overwrite mode: In the insert mode the contents of the timeline as it is will be preserved and moved backwards in the timeline while in the overwrite mode it will be overwritten (see also section "Insert/Overwrite Mode of the Timeline" on page 6-30):

- Add the clip to the timeline as described in section "Adding Clips to the Timeline" on page 6-2 and drag it to the set inpoint of the timeline.

With the snapping mode active the clip will adjust itself automatically at the inpoint of the timeline when the mouse cursor is in close proximity to it. After releasing the mouse button the clip will be added to the timeline at the exact position. Furthermore, if its length exceeds the length of the marked part of the timeline via in- and outpoint, it will be trimmed to the exact length determined by the outpoint of the timeline automatically.

The length of a timeline element, i.e. its outpoint, can also be adjusted frame accurately with its timeline element properties (see section "General Items of the Properties Area" on page 7-3).

6.4.5 Deleting Timeline Elements in a Specified Range

You can delete all timeline elements in a specified range of the timeline easily. To determine the range and part of the timeline where the deletion should occur you have to use the timeline's in- and outpoint. Afterwards all timeline elements between the in- and outpoint of the timeline can be deleted.

- Set the inpoint of the timeline at the position where the range should begin (see section "Setting an In- and Outpoint for the Timeline" on page 6-28).
- Set the outpoint of the timeline at the position where the range should end (see section "Setting an In- and Outpoint for the Timeline" on page 6-28).

Now you are able to delete the timeline elements:

- Call up the context menu of the timeline scale and select the menu option ***Delete from in to out***:

The menu option ***Delete from in to out*** will be available as soon as an in- and outpoint of the timeline are set.

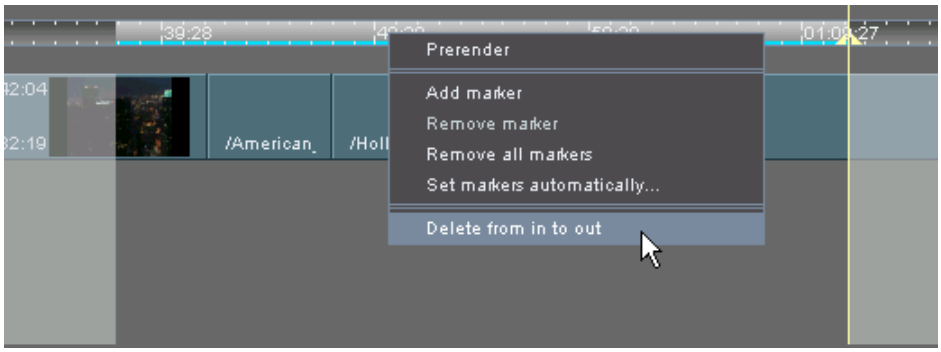


Figure 6-36: Deleting timeline elements from a timeline range

This will delete all timeline elements between the in- and outpoint of the timeline. If appropriate, the elements will be cut at the position of the in-/outpoint. Whether a gap occurs in this part of the timeline or the rest of the timeline is moved to the left to stay in direct connection with all previous timeline elements depends on the insert/overwrite mode of the timeline area (see also section "Insert/Overwrite Mode of the Timeline" on page 6-30). When a track is locked (see section "Muting and Locking Tracks" on page 6-32), its timeline elements are not deleted.

6.4.6 Performing a Cut

Once at least one clip is present in the video or audio tracks of the timeline, you can cut the clip at a desired position. For this perform the following:

- Move the timeline cursor to the desired position in the timeline as described in section "Moving within the Timeline" on page 6-25.

When zoomed far into the timeline, the timeline cursor provides a frame-end marker that indicates where the selected frame ends in the timeline (see also section "Moving via the Timeline Scale" on page 6-25). This may help you during the positioning of the timeline cursor.

- Then press the button **+ EDIT**.

This will cut the clip and set a cutting/edit point at the selected position. Then you can, for example, delete one of these clips (select the clip and press the [Del] key on your keyboard), move it to another position (see section "Moving Clips within the Timeline" on page 6-34) or alter its properties differently (see chapter "Timeline Element Properties" on

page 7-1). When a track is locked (see section "Muting and Locking Tracks" on page 6-32), its timeline element is not cut.

The length of a timeline element, i.e. its outpoint, can also be adjusted frame accurately with its timeline element properties (see section "General Items of the Properties Area" on page 7-3).

6.4.7 Setting Transitions

When at least two clips are present in a video track of the timeline you can set a transition between these two clips. After the setting of a transition you can change its properties or, if applicable, prerender the transition (see section "Prerendering of Timeline Elements" on page 6-41). This section describes in the following the necessary procedures to apply transitions to cutting points on the timeline.

To apply a transition to a cutting point perform the following:

- Move the timeline cursor to the cutting point between the two clips with the respective controls (e.g. , see also section "Moving within the Timeline" on page 6-25 and section "Controls" on page 5-11).

This will make the button **TRANS** available in the user interface.

To set a transition there must be enough head and/or tail available of at least one clip to make a blending possible, otherwise the button **TRANS** will be unavailable. You can create the necessary head and tail manually by adjusting the in- and outpoint of clips (see section "Changing In- and Outpoints of Timeline Elements" on page 6-43).

If you are in the overwrite mode of the timeline, the Edit Tool will create the head and tail for the transition automatically. This means that parts of the clips will be moved for the transition. Due to the moving of the clips the creation of a transition in the overwrite mode may cause gaps in the timeline. More information about the overwrite mode can be found in section "Overwrite Mode" on page 6-31.

- Select the button **TRANS**.

A transition appears between the two clips (by default set to a 'Cross-fade' wipe):

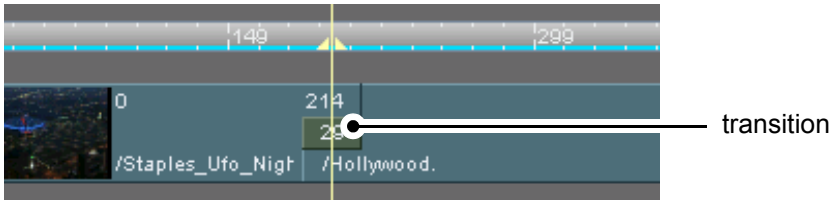


Figure 6-37: Transition between clips

The exact position of the transition depends on the available head and tail. If head and tail are sufficiently available for both clips, the transition will be positioned exactly in the middle of the timeline cursor.

The transition is now added to the timeline and you can proceed, for instance, by calling up its properties and altering them to adjust the transition to your needs. How to do this and the individual items available to change a transition are described in chapter “Timeline Element Properties” on page 7-1.

You can delete a transition the same way you delete a clip from the timeline. Simply select its visual representation in the timeline and press the key [Del] on your keyboard or select from its context menu the menu option ***Delete***.

Depending on the resolution of the material and the type of operators used in the timeline, it may be necessary to prerender the transition (see section “Prerendering of Timeline Elements” on page 6-41).

6.4.8 Prerendering of Timeline Elements

When adding timeline elements, such as clips or operators, to the timeline, they are immediately tested for their real-time capability which depends on various factors, such as frame size, play-out frequency, location of the clip on the storage, etc. Those elements that exceed the real-time capability of the DVS system will be subject to a prerendering. Fact is, the greater the resolution of the material in the timeline and/or the video raster set for an output the more likely the chance that a prerendering is required. Then the system will not be able to handle the respective clip or operator in real time.

A prerendering may be indicated for all types of timeline elements, i.e. clips as well as operators (e.g. transitions). If any exceed the real-time capability of the DVS system, they will be marked for a prerendering. Further information about the real-time capability of clips can be found in section “Real-time Capability of Clips” on page 4-13.

A prerendering of timeline elements means that the Edit Tool calculates the elements before a play-out takes place and stores the calculated ex-

tra files (rendered images) in a temporary location on the storage. These are then used for a play-out instead of the original material in the timeline.

It is best to handle and administer the temporary data project specific, meaning for each project in a different temporary storage location. Further information about this can be found in section "Notes on Project Management" on page 2-11.

A part of the timeline that has to be prerendered before a play-out will be displayed with a yellow line in the timeline scale:

Depending on the optional features and the hardware equipment available, your DVS system may still be able to handle elements that are marked to be prerendered in real time. However, if non-real-time capable material is played out, frames will be dropped (see section "The Performance Monitor" on page 4-32). With operators that are not real-time capable, the system will simply not apply them. In both cases the material has to be prerendered prior to a play-out.

Whether the DVS software marks a timeline element to be prerendered, can to some degree be determined with a setting in the Configuration Tool. More information about this can be found in the "Fuze Configurations" user guide.

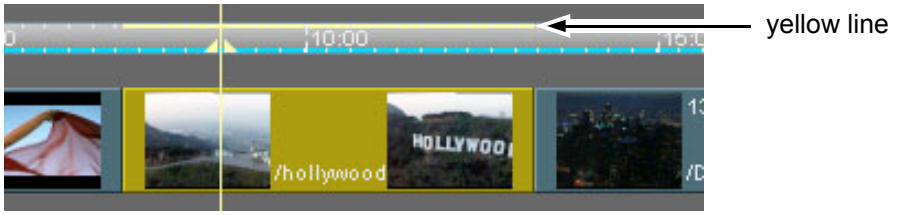


Figure 6-38: Timeline element marked for prerendering

Additionally, video clips that are subject to a prerendering will be marked in the timeline with colors:

yellow	The clip has to be prerendered (see figure above).
purple	The clip is currently prerendered. Its progress can be seen in the job list.
blue	The clip is already prerendered.

With a double-click of the mouse on the timeline scale below the yellow line you can start the prerendering process. Alternatively, you can use the menu option ***Prerender*** on the context menu of the timeline element. The progress of the rendering can be seen in the job list of the tab **Jobs** (see section "Jobs" on page 4-29).

You can delete prerendered data, for example, if it is no longer required, with the menu option ***Delete prerendering*** on the context menu of a video clip.

For more information about the prerendering process in general see section “Working with Prerendered Data” on page 2-9.

After a prerendering save your project file. If an already saved project file is not saved after a prerendering process again, the prerendered files will not be recognized by the Edit Tool when the project file is loaded once more: They will not be used for a play-out and have to be deleted manually (as described in section “Cleaning Temporary Data Manually” on page A-22).

Also related to the prerendering of files is the ***Prerender all*** menu option on the menu ***Project*** (see section “Prerender all” on page 8-11).

6.4.9 Changing In- and Outpoints of Timeline Elements

Before a clip is added to the timeline you may adjust its inpoint via the bin of the Edit Tool (see section “Preparing Clips for Editing Purposes” on page 4-20). However, after clips or other timeline elements are added to the timeline you have further possibilities at hand to change their in- and outpoints.

For a frame accurate trimming of the in- and outpoints you may also use the appropriate keyboard shortcuts after the selection of the in-/outpoint handler (see also section “Keyboard Shortcuts” on page A-6).

To change in- and outpoints of timeline elements, such as a video clip, already added to the timeline perform the following:

- Select from the clip’s representation its in- or outpoint handler and move it to the right or to the left to extend or reduce the clip’s length in the timeline.

You cannot change in- and outpoints beyond the limits of the original material on the storage.

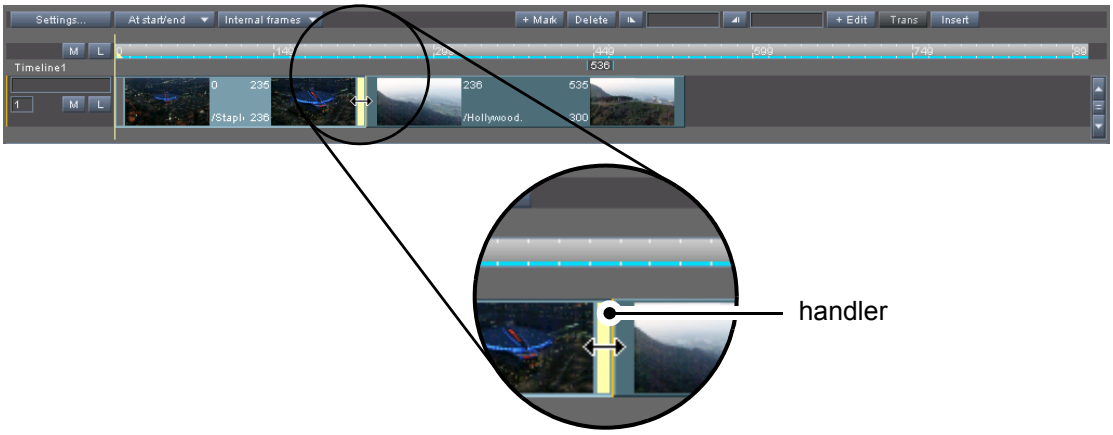


Figure 6-39: Changing of in- or outpoint

This will change the in- or outpoint of the clip accordingly.

This procedure can be used for all timeline elements, i.e. video clips, audio clips and embedded operators (e.g. transitions). To adjust their length in the timeline simply select their in-/outpoint handler and move it to the right or left of the timeline. The following figure shows, for example, how to change the length of a transition:

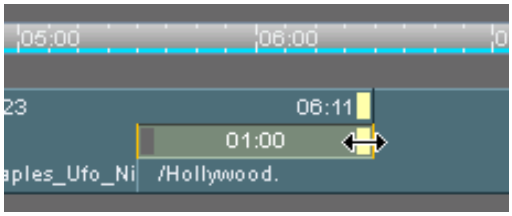


Figure 6-40: Changing the length of a transition

The length of a timeline element, i.e. its outpoint, can also be adjusted frame accurately with its timeline element properties (see section “General Items of the Properties Area” on page 7-3).

As long as the insert mode of the Edit Tool is active, the subsequent clips and embedded operators will automatically adjust their positions on the timeline respectively. When the Edit Tool is set to the overwrite mode, gaps may occur in the timeline. More information on this can be found in section “Insert/Overwrite Mode of the Timeline” on page 6-30.

The in- or outpoint handler will react to certain elements of the timeline (snapping mode) to allow for an automated positioning. You can deactivate the snapping mode and activate a fine tuning mode by pressing the [Shift] key. Further information about the snapping mode can be found in section “Moving Clips within the Timeline” on page 6-34.

During the positioning of the in- or outpoint handler of clips you can see a representation of the length of the clip in its timeline track. The blue line right above the clip shows its original length:

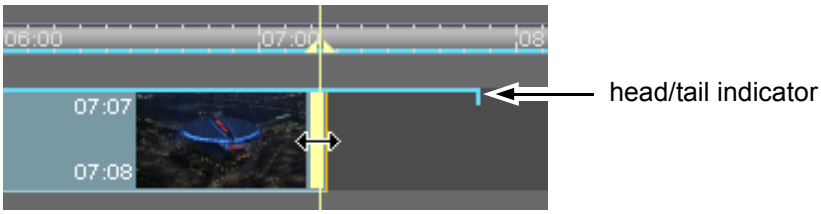


Figure 6-41: Display of original length of clip

With this you can easily determine whether and how much head or tail is available to, for example, create a transition.

6.4.10 Advanced Trimming

The advanced trimming features of the Edit Tool work the same way as the changing of in- and outpoints of elements already added to the timeline (see section "Changing In- and Outpoints of Timeline Elements" on page 6-43). They are available when you select two or more in- or outpoint handlers of timeline elements present in the timeline.

This procedure can be used for all timeline elements, i.e. video clips, audio clips and embedded operators (e.g. transitions).

For further, more general information about trimming see section "Changing In- and Outpoints of Timeline Elements" on page 6-43.

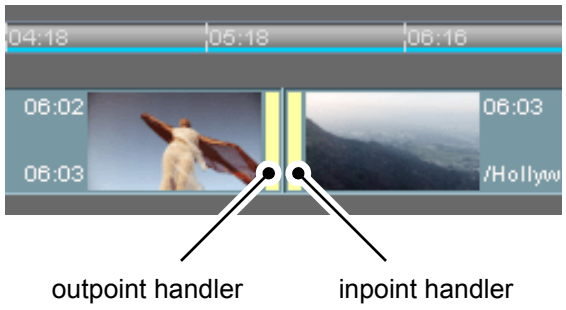


Figure 6-42: In- and outpoint handlers selected

To select more than one handler perform the following:

- Select one of the desired handlers with a click of the mouse.
- Hold down the [Ctrl] key while clicking on another handler with the mouse.
- Perform this step for as many additional handlers as you want.

After that you can click on one of the handlers and drag it to another position. The rest of the selected handlers will act accordingly.

To trim several in- or outpoint handlers there must be enough head and tail available for all selected timeline elements, otherwise a trimming will not be possible.

With the selection of more than one handler of timeline elements you have some advanced possibilities for trimming at hand:

– If you select the outpoint handler of one clip and the inpoint handler of the neighboring clip to the right (as can be seen in figure 6-42 on page 6-45), you can extend the length of one clip while shortening the length of the other at the same time. Thus the timeline length will be maintained.

Figure 6-43: Selected in- and outpoint handlers of neighboring clips

– If you select either two outpoint handlers or two inpoint handlers, you can adjust the length of the two clips simultaneously.

Figure 6-44: Two selected outpoint handlers

The following two trimming techniques are called 'slip and slide trimming'. These are two sophisticated trimming techniques which can be used for a frame accurate moving of in- and outpoints of clips while maintaining the length and duration of the timeline:

– Slide trimming: When you select one out- and one inpoint handler thereby enclosing another clip, you can change the out- and inpoint of the two clips while the enclosed clip is fully maintained, in its length as well as in its contents. This way you can alter the position of the enclosed clip while the timeline length remains constant.

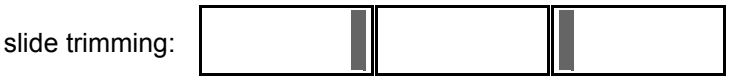


Figure 6-45: Enclosing a clip by selecting in-/outpoint handlers of neighboring clips

– Slip trimming: When you select the in- and outpoint handlers of a single clip, you can change its in- and outpoint simultaneously. This will change the contents of the clip only. The length of the clip, its position and the length of the timeline is preserved.

Figure 6-46: Changing the contents of a clip

6.4.11 Marking Positions in the Timeline

To mark certain positions in the timeline, e.g. to remind you to cut the clip at this position or other reasons, you can place timeline markers in the timeline of the Edit Tool.

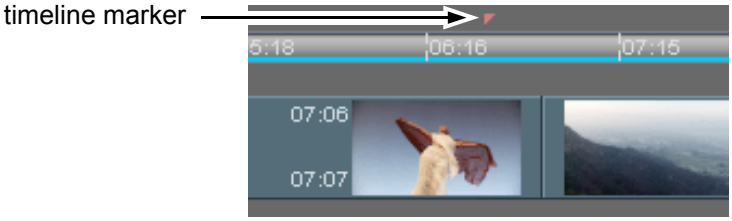


Figure 6-47: Timeline marker in timeline

Once one or more markers are placed in the timeline you can easily jump to them with the respective controls ( ) of the control area (see section “Controls” on page 5-11).

The appearance of timeline markers can be configured to your liking with the Configuration Tool (see “Fuze Configurations” user guide).

A list of all markers positioned in the timeline is available via the tab **Markers** of the tool area (see section “The Marker Table” on page 4-30).

This section explains how to set and use markers.

Marker Types

Currently there is only one type of marker available for the timeline:

`Timeline Marker`	The default marker type for the timeline.

Markers of the type `Timeline Marker` can also be used to show where drops occurred during a real-time operation. If this happens they can be easily placed via the performance monitor of the DVS software. Afterwards they will be indicating the position of the drops that occurred (see section “The Performance Monitor” on page 4-32).

How to Set Timeline Markers Manually

Markers of the type `Timeline Marker` can be manually placed in the timeline of the Edit Tool. For this perform the following:

- Move the timeline cursor to the position where the marker should be set.
- After this select the button **+ MARK** available in the user interface of the Edit Tool.

Alternatively, you can also use the menu option ***Add Marker*** on the context menu of the timeline scale.

This will add a marker to the timeline of the Edit Tool at the current position of the timeline cursor.

How to Set Markers Automatically

Markers can also be positioned automatically. For this perform the following:

- Select from the context menu of the timeline scale the menu option ***Set markers automatically…***.

This will open the following window:

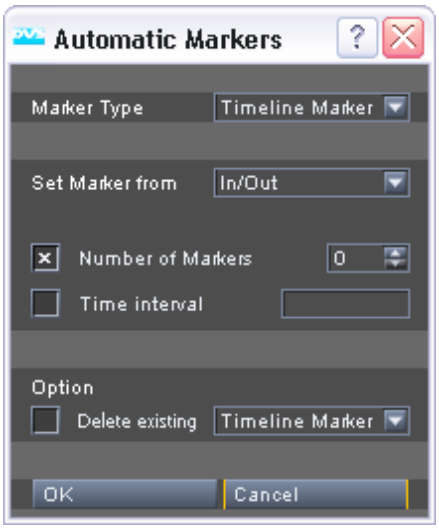


Figure 6-48: Dialog to add markers to the timeline automatically

- Configure the settings to automatically position markers according to your requirements.
- Afterwards generate the markers by clicking the **OK** button.

This will create the markers of the selected type in the timeline of the Edit Tool.

How to Remove Markers from the Timeline

To remove a single marker and delete it from the timeline perform the following:

- Jump with the timeline cursor to the respective timeline marker that you want to remove or place the timeline cursor manually on its position.
- Then call up the context menu and select the menu option ***Remove marker***.

This will remove the timeline marker from the timeline.

You also have the possibility at hand to remove all timeline markers in one step from the timeline. For this select the menu option ***Remove all markers*** from the context menu.

6.4.12 Attaching Audio Clips to Video Clips

Sometimes during your editing work you may want to group audio and video clips, for instance, if they are already perfectly aligned and in synchronization. For this the timeline provides the possibility to attach an audio to a video clip.

When attaching more than two timeline elements, you can attach one video clip to several audio clips only. It is not possible to attach several video clips to one or more audio clips. Furthermore, it is not possible to attach clips of one type only, e.g. audio clips only.

How to Attach Clips

To attach audio clips to a video clip perform the following:

- Select a video clip and one or more audio clips in the timeline area with the mouse while holding down the [Ctrl] key.
- Afterwards release the [Ctrl] key and call up on one of the selected clips or on an empty part of the timeline the context menu.
- On the context menu select the menu option ***Attach***.

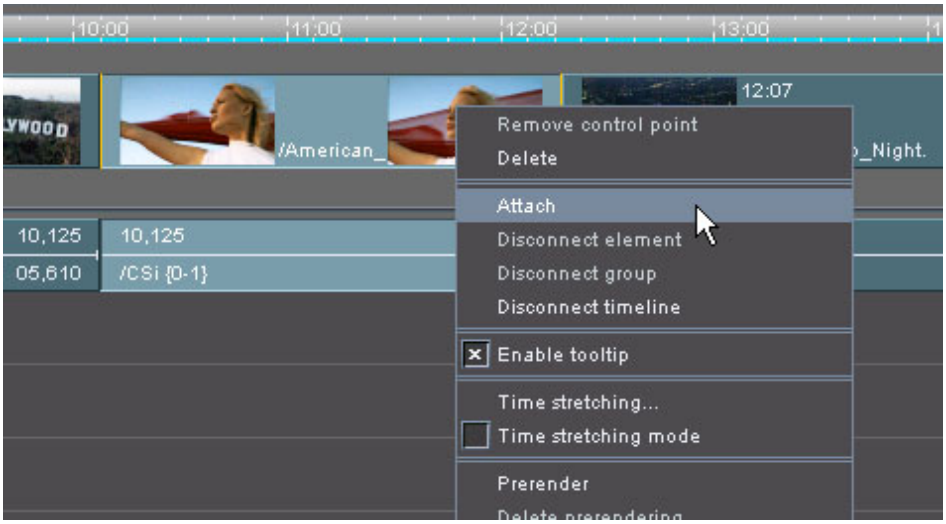


Figure 6-49: Attaching audio and video clips

Once this is done, the audio clip(s) will be attached to the selected video clip. Now, if either one of these clips is selected in the timeline, the other, attached clip(s) will be selected as well and they can then, for example, be moved easily together while their alignment and relative position to each other is maintained.

However, because attached clips can only be used in the overwrite mode of the Edit Tool, once clips are attached in the timeline, the software switches on the overwrite mode automatically.

When working with attached clips in the timeline, you cannot switch to the insert mode anymore. The button to switch between the two different modes appears dimmed and is no longer available. Further information about the insert and overwrite mode can be found in section “Insert/Overwrite Mode of the Timeline” on page 6-30.

To activate the insert mode all timeline elements have to be disconnected.

How to Disconnect Attached Clips

To sever an attachment of clips or to switch back to the insert mode of the Edit Tool you have to disconnect the attached clips:

- Select the attached clips or a specific clip of the attachment and call up its context menu.

- Then use either one of the following menu options:

Disconnect element	Disconnects and severs only the selected clip from the attachment. If the attachment comprises several clips, i.e. one video clip and several audio clips, the rest of the attachment will be maintained.
Disconnect group	Disconnects and severs the attachment of all elements in the group where the context menu was invoked. Regardless of the number of timeline elements in the attachment all will be disconnected.
Disconnect timeline	Disconnects and severs the attachments of all attached timeline elements in the timeline in one step.

After that the attached clip(s) will be severed and disconnected. In case the timeline does not contain other attachments, the button for the insert mode will be available and ready for a selection again.

6.4.13 Time Stretching or Time Compression of Clips

Video and audio clips added to the timeline can be time stretched or time compressed in real time with common interpolations (frame/field repetition or skipping of frames/fields). Time stretching or time compression allows you to speed up or slow down the play-out of a clip, for instance, for slow/fast motion purposes or to match your project's pace. For this the respective timeline element can be automatically resized in the timeline, left in its original size (set via the clip's in- and outpoint) or adjusted to the desired length manually in the timeline.

When changing the timing of audio clips, no pitch control is provided. Thus it should be used for slight timing changes only.

For frequency changes of the timeline, e.g. when playing out or finalizing with a different video raster, an automatic retiming of audio can be configured (see figure in section "How to Configure the Video Output" on page 6-11 and section "Configuring Audio" on page 6-75).

You can configure the time stretching or time compression via the menu option ***Time stretching...*** on the context menu of a clip (see section "The Context Menu of Video Clips" on page 6-55 and section "The Context Menu of Audio Clips" on page 6-63). It will open the following window:

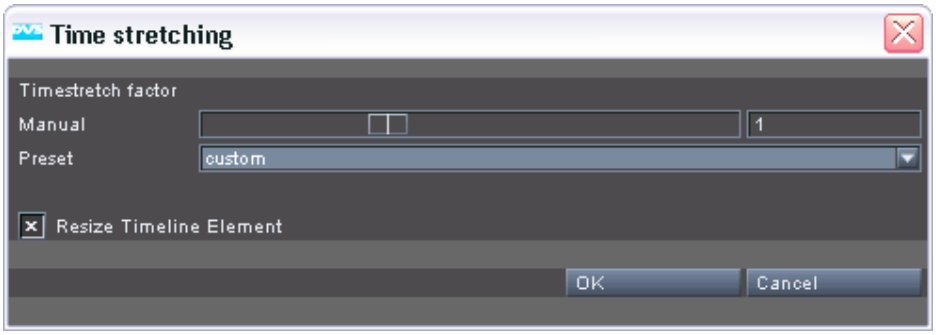


Figure 6-50: Time stretching or time compression configuration

To configure the time stretching or time compression use the items offered under **Manual**. When adjusting the slider, the factor value in the entry field to the right changes accordingly. Alternatively, you can enter a factor directly in the entry field to the right of the slider:

Factor	Slider Movement	Meaning
< 1	left	Values less than one (1) mean that the clip gets time stretched, i.e. its play-out will be slower (slow motion).
> 1	right	Values greater than one (1) indicate a time compression of the video clip, i.e. its speed will be increased (fast motion).

The combo box **Preset** allows you to select common timing changes from its drop-down list. Once one of the predetermined settings is selected, the **Manual** items will be adjusted accordingly.

The **Resize Timeline Element** check box resizes the clip automatically in the timeline accordingly once the settings for stretching/compression are confirmed. When time stretched, the clip will be lengthened in the timeline (outpoint of the clip moves to the right); when time compressed, the clip will be shortened (outpoint moves to the left). If the check box is deactivated, the length of the timeline element in the timeline will be preserved, meaning when time stretched, the outpoint of the clip will be trimmed back; and when time compressed, the possible alteration depends on the available tail of this clip (without tail a time compression will not be possible).

The configured time stretching or time compression will be in effect for the clip in the timeline as soon as it is confirmed with the **OK** button. The button **CANCEL** closes the window without altering the settings.

Time stretching or time compression can also be performed directly in the timeline. This may be helpful when adjusting clips to a specific length in the timeline, for example, to fit inbetween two other clips. For this the ***Time stretching mode*** menu option on the context menu of

a clip has to be activated (check box in front of menu option activated). Then all alterations to the clip's in- or outpoint in the timeline (see section "Changing In- and Outpoints of Timeline Elements" on page 6-43) will be a time stretching or time compression and the values in the time stretching or time compression window will be altered automatically. With this the clip and its in- and outpoint can be easily aligned to other elements in the timeline via the snapping mode of the Edit Tool to ensure it provides the correct length in the timeline (in- and outpoint remain constant while the speed is changed).

Clips can be set back to a speed of one (1) easily by setting the speed factor back to one (1). However, depending on the time stretching factor(s) used rounding errors may occur, meaning for frame accurate length you may have to trim the outpoint of the clip.

6.4.14 Relinking Clips

Clips of either video or audio can be relinked in the timeline, i.e. they can be referenced to other source material manually from the timeline directly. To do this perform the following:

- Select the clip whose source material should be changed in the timeline.
- Then select from the context menu of this clip the menu option ***Relink clip...*** (see section "The Context Menu of Video Clips" on page 6-55 and section "The Context Menu of Audio Clips" on page 6-63).

This will open the standard dialog window of the DVS software for the selection of a file.

- Select the new source in this dialog window.

Once confirmed with the button **OPEN**, the clip selected as the new source will be referenced to the clip's representation in the timeline and a new bin clip will be added to the root folder of the bin. Afterwards, in case of a video clip, you will see the new video material in the video overlay once the timeline cursor is positioned on this clip. Any heads and tails configured for the clip will be available with the new source material as well.

When linking to new material the source in- and outpoint of the original clip in the timeline are used, i.e. its frame numbers. To receive images in the timeline the new material must provide the same frame numbers for in- and outpoint as the original material.

6.5 Working with Video Clips

The Edit Tool works with representations of clips in the timeline only. This means that as long as you perform your work on the timeline, the original material on the storage is maintained and never altered.

The appearance of the clips in the video track(s) of the timeline can be altered in several ways: You can change the height of the track(s) and the display of the thumbnails. You can also display an unlimited number of video tracks for a vertical editing in the timeline. For more information about all this please refer to section "Changing the Layout of the Timeline Area" on page 6-5.

This section describes several features of video clips added to the video track(s) of the timeline of the Edit Tool.

6.5.1 The Clip's Information

The video clips in the video track(s) of the timeline provide several information via their text display.

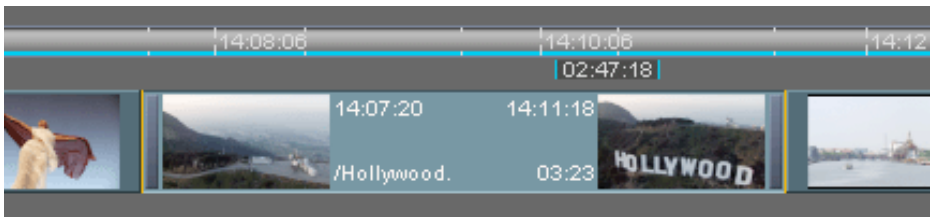


Figure 6-51: Representation of video clip

The following information are provided:

top left — Usually, the exact inpoint of the clip on the timeline.

This value and its notation depend on the display setting for the timeline (timecode/frame notation, see section "Configuring the Timeline Scale" on page 6-8) and the display type setting of the timeline (see section "Changing the Display Type" on page 6-9).

top right — Usually, the exact outpoint of the last frame of the clip on the timeline.

This value and its notation depend on the display setting for the timeline (timecode/frame notation, see section "Configuring the Timeline Scale" on page 6-8) and the display type setting of the timeline (see section "Changing the Display Type" on page 6-9).

bottom left — Name of the clip as it is available in the bin together with its folder path.

bottom right — Length/duration of the clip.

You can receive additional information about the clips via their tooltips which can be customized to your individual needs (see section "Configuring the Tooltips of Clips" on page 6-9 for further information).

6.5.2 The Context Menu of Video Clips

The context menu of video clips (usually invoked with a right-click of the mouse) provides the following menu options and functions that can be used with video clips:

Delete	This menu option deletes the respective clip where the context menu was invoked from the timeline. Alternatively, you can select the clip and press the [Del] key on your keyboard.
Attach ***Disconnect element*** ***Disconnect group*** ***Disconnect timeline***	These menu options enable you to work with attached clips: Sometimes during your editing work you may want to group audio and video clips, for example, if they are already perfectly aligned and in synchronization. For this the timeline provides the possibility to attach audio to video clips. Further information about how to work with attached clips and how to use these menu options can be found in section "Attaching Audio Clips to Video Clips" on page 6-49.
Enable tooltip	Clips added to the timeline provide various information via tooltips. With this menu option you can activate or deactivate the display of the tooltips when the mouse cursor is placed over a clip in the timeline area. If it is activated, the menu option will show a cross in front. Additional information about tooltips can be found in section "Configuring the Tooltips of Clips" on page 6-9.

Time stretching… ***Time stretching mode***	Video and audio clips added to the timeline can be time stretched or time compressed to speed up or slow down the play-out of a clip, for example, for slow or fast motion purposes. Further information about these menu options can be found in section "Time Stretching or Time Compression of Clips" on page 6-51.
Prerender	If a timeline element needs to be prerendered, you can start the prerendering process with this menu option. Further information about this can be found in section "Prerendering of Timeline Elements" on page 6-41.
Delete prerendering	When a timeline element is already prerendered you can delete its prerendered files with this menu option (see also section "Prerendering of Timeline Elements" on page 6-41).
Export to application	When a clip is present in a video track of the timeline area, you can process its source material with a third party application of your choice either by using the original data directly (destructive export) or by previously copying the material beforehand. Afterwards it will be provided again in the DVS software for further usage. More information about this can be found in section "Processing the Source Material of a Timeline Element" on page 6-58.
Select all	With this menu option all clips in the timeline area can be selected in one step. Further information about how to select clips in the timeline can be found in section "Selecting Clips" on page 6-36.
Cut ***Copy*** ***Paste***	Using these menu options timeline elements can be cut or copied to the clipboard of the operating system and afterwards pasted again at the location of your choice. Further information about this can be found in section "Cutting, Copying or Pasting Clips" on page 4-18.
Relink clip	Once a clip is available in the timeline, it can be relinked, i.e. referenced to other source material manually from the timeline directly. For further information about this see section "Relinking Clips" on page 6-53.
Bin-Clip properties	With this menu option you can open from a clip in the timeline the properties of its source clip in the bin (see section "Changing the Properties of Clips" on page 4-21).

Show alpha channel only	This menu option displays the alpha channel (key) of a video clip in the video overlay as well as at the outputs of the DVS system. For further information see section “Displaying the Alpha Channel” on page 6-61.
Add track	Increases the amount of video tracks that will be visible in the timeline area by one (see also section “Video and Audio Track Properties” on page 6-6).
Remove track	Decreases the amount of video tracks that will be visible in the timeline area by one (see also section “Video and Audio Track Properties” on page 6-6).

6.5.3 Consistencies of Clips

During the loading of a project file or the import of a bin (see section “Open…” on page 8-4 and section “Import Bin…” on page 8-14), video clips are checked for inconsistencies: It is tested whether the first and the last frame of each video clip is available on the storage. However, frames missing inbetween the first and the last frame are not verified automatically.

If the first and/or last frame of a clip is missing, you will be informed about this the same way as described in section “Check Bin” on page 8-15.

If a clip is played out where frames are missing, the missing frames will be substituted by the DVS software automatically with a standard image:

Figure 6-52: Substitute image for a missing frame

Then it is best to check your bin and thus your timeline for inconsistencies more thoroughly with the menu option ***Check Bin*** on the ***Bin***

menu (see section "Check Bin" on page 8-15). This menu option will provide you with a list of the clips where frames are missing. After that either the whole clip or the missing frames should be replaced.

6.5.4 Processing the Source Material of a Timeline Element

The Edit Tool provides an export of either the original source material or a copied version of it to a third party application of your choice. This way you can process the source material of a video clip further and afterwards use it again in the DVS software without any difficulty.

When a clip is present in a video track of the timeline area, you can process its source material either by using the original data directly (destructive export) or by previously copying the material beforehand. To do this you have to use the menu option ***Export to application*** on the context menu of a video clip in the timeline of the Edit Tool. It opens a submenu where you can select other applications than the DVS software to process your video data (see also section "The Context Menu of Video Clips" on page 6-55).

To have an application available in this submenu you have to define and set it first. This can be done with the Configuration Tool (group **External**, see "Fuze Configurations" user guide). Please note that you have to set the appropriate program parameters, if applicable, in the **Options** entry field as well.

Please note that the **Destructive export** option is valid for all specified external applications. If activated, the source data will always be processed directly. When saving the data in such a case with an external application, the source material will be overwritten.

Figure 6-53: Accessing an external application

This menu option will export the source material of the clip according to your settings made for this application in the Configuration Tool.

When a sequence processing is enabled, each frame between a set in- and outpoint of the timeline will be sent to the external application. However, this applies to a single clip only: If the in- and outpoint are set outside of the clip where the menu option ***Export to application*** was called, only the image sequence of the clip where the menu option was called will be sent.

If a non-destructive export is selected for the external applications, the source material of the clip will be copied to the same path and location

where the original material is stored with an incrementing number added to the directory name of the clip (*<name of clip's directory><incrementing number>*). After this the copied source material will be opened in the external application where you can process it. In the meantime the clip's representation in the timeline of the Edit Tool will be changed to the location of the copied material, i.e. a new bin clip will be added to the bin of the Edit Tool and the representation of the clip in the video track of the timeline will be changed to this new bin clip and location. As soon as you have processed the material with the other application and saved it, you can use it immediately in the software without having overwritten the original source (its bin clip is still present in the bin).

When a destructive export is selected for the external applications, no changes will be applied to the clip's representations in the Edit Tool. The source material is sent directly to the external application where it can be processed. Once the changes are saved, the material can be immediately accessed with the DVS software. However, due to the destructive export, your original source material on the storage will be lost.

6.5.5 Vertical Editing of Video Clips in the Timeline

With the Edit Tool and the timeline area configured to several video tracks you can perform a vertical editing in the timeline.

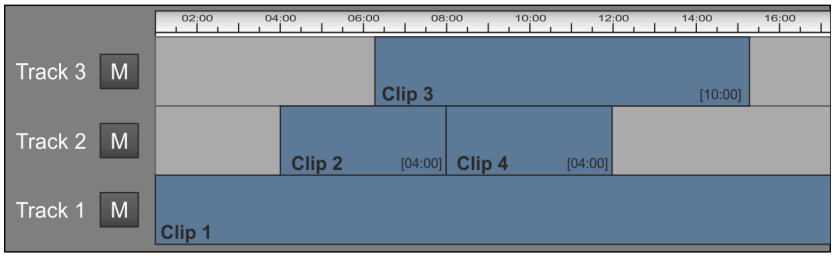
To perform a vertical editing the timeline area has to be configured to contain more than one video track (see section "Video and Audio Track Properties" on page 6-6).

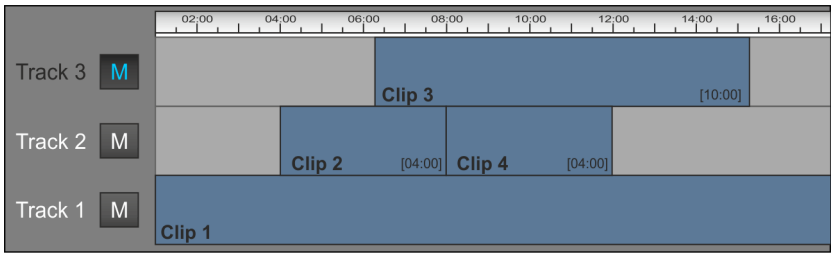
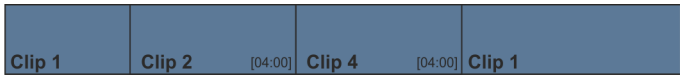
Tracks can also be added/removed via context menu (see section "The Context Menu of Video Clips" on page 6-55 and section "The Context Menu of Audio Clips" on page 6-63).

The approach to work with several video tracks vertically in the timeline is different from the usual one of a horizontal editing in a timeline. Then the various tracks of the timeline form a stack: By placing different or differently edited timeline elements in other video tracks at the same position in the timeline you can change the contents for a play-out at that position easily.

With vertical editing you still work with the video track(s) as usual, i.e. horizontally. But, for instance, in case you want to realize a temporary cutaway or to evaluate the visual outcome of different shots at a particular position in the timeline, simply place the respective timeline elements in another track in the timeline. The higher the track number the more priority is given to the respective track during a play-out.

Then, with the help of enabling and disabling the respective tracks (button **M**, see section "Muting and Locking Tracks" on page 6-32) you can easily determine the best possible solution for your work.

Example 1:
In the example below the timeline is configured to several video tracks. All tracks are enabled (not muted), i.e. all tracks will be played out.    When a play-out is initiated, the result will be that clip #3 overlays the ones below it, i.e. the ones with a lower priority. Play-out result:

Example 2:
In the second example the uppermost track is now disabled (muted).    When a play-out is initiated, this will lead to an output where clip #3 is not given out at all while the clips #2 and #4 overlay the clip #1 present in the first video track (the one with the lowest priority). Play-out result: 

The display of the video tracks can be reversed via the Configuration Tool (see "Fuze Configurations" user guide for more information). However, this does not affect the play-out priority, i.e. the priority of the video track with the highest number over the others when enabled.

6.5.6 Displaying the Alpha Channel

For blue-screen operations or compositing the alpha channel (key) of a video clip is important. With the DVS software you can display the alpha channel of individual clips in the video overlay as well as at the outputs of the DVS system.

To display the alpha channel of a video clip you have to activate the menu option ***Show alpha channel only*** on the context menu of a video clip in the timeline of the Edit Tool (see also section "The Context Menu of Video Clips" on page 6-55). Then the video overlay and the DVS system's video outputs will show you the alpha channel mask of the video clip where the menu option was activated. The parts of the images displayed in white are selected, black areas are not selected (i.e. keyed out).

In case a clip provides no alpha channel, the displayed images will be completely white, showing that nothing is keyed out.

6.6 Working with Audio Clips

With audio clips it is the same as with video clips: The DVS software works with representations of the clips in the timeline only. Throughout your work in the Edit Tool the original material on the storage is maintained and never altered.

By default the timeline area will show 16 audio tracks where you can add audio clips in the desired sequence, set fade-ins and -outs and control the volume of each clip.

The number of audio tracks displayed in the Edit Tool can be set freely (see section “Video and Audio Track Properties” on page 6-6).

To get a proper output you have to configure the audio hardware output accordingly (see section “How to Configure the Audio Output” on page 6-13).

The DVS software supports audio files with multiple mono or stereo channels. If you drag such a clip from the bin to the timeline, the additional channels will be added to the other audio tracks below the selected one.

This section describes several features of audio clips added to the audio tracks of the timeline.

6.6.1 The Clip's Information

Audio clips in the audio tracks of the timeline provide several information via their text display.

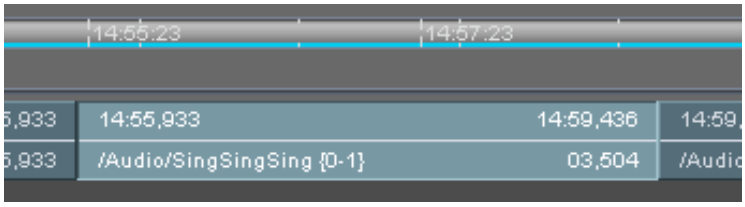


Figure 6-54: Representation of audio clip

The following information are provided:

top left	Exact inpoint of clip on the timeline; with the timeline set to the timecode notation, the seconds and frames will be shown as seconds in a decimal number, i.e. with milliseconds; when the frame notation is activated, the inpoint will be displayed in milliseconds only

top right	Exact outpoint of the clip on the timeline (minus one sample); with the timeline set to the timecode notation, the seconds and frames will be shown as seconds in a decimal number, i.e. with milliseconds; when the frame notation is activated, the outpoint will be displayed in milliseconds only
bottom left	Name of the clip as it is available in the bin together with its folder path; in curly brackets the audio channels (streams) of the clip indicating its audio mode, e.g. `0-1` meaning a stereo stream of channel 0 and 1, or `0-0` meaning a mono stream of channel 0
bottom right	Length/duration of the clip

The audio mode of the clip can be changed in its clip properties (bin). For this the clip must not be present in the timeline of the Edit Tool.

With the display type set to `File number`, the in- and outpoint information of the clips will provide the in- and outpoint with regard to the single audio file only (in milliseconds), i.e. untrimmed each audio clip in the timeline will begin with zero and end with its total duration (see also section "Changing the Display Type" on page 6-9).

You can receive additional information about the clips via their tooltips which can be customized to your needs (see section "Configuring the Tooltips of Clips" on page 6-9 for further information).

6.6.2 The Context Menu of Audio Clips

The context menu of audio clips (usually invoked with a right-click of the mouse) provides the following menu options and functions that can be used with audio clips:

Remove control point	With this menu option you can delete a volume control point that was set on the volume control line (see section "Volume Control" on page 6-65).
Delete	This menu option deletes the respective clip where the context menu was invoked from the timeline. Alternatively, you can select the clip and press the [Del] key on your keyboard.

Attach ***Disconnect element*** ***Disconnect group*** ***Disconnect timeline***	These menu options enable you to work with attached clips: Sometimes during your editing work you may want to group audio and video clips, for example, if they are already perfectly aligned and in synchronization. For this the timeline provides the possibility to attach audio to video clips. Further information about how to work with attached clips and how to use these menu options can be found in section "Attaching Audio Clips to Video Clips" on page 6-49.
Enable tooltip	Clips added to the timeline provide various information via tooltips. With this menu option you can activate or deactivate the display of the tooltips when the mouse cursor is placed over a clip in the timeline area. If it is activated, the menu option will show a cross in front. Additional information about tooltips can be found in section "Configuring the Tooltips of Clips" on page 6-9.
Select all	With this menu option all clips in the timeline area can be selected in one step. Further information about how to select clips in the timeline can be found in section "Selecting Clips" on page 6-36.
Cut ***Copy*** ***Paste***	Using these menu options timeline elements can be cut or copied to the clipboard of the operating system and afterwards pasted again at the location of your choice. Further information about this can be found in section "Cutting, Copying or Pasting Clips" on page 4-18.
Relink clip	Once a clip is available in the timeline, it can be relinked, i.e. referenced to other source material manually from the timeline directly. For further information about this see section "Relinking Clips" on page 6-53.
Bin-Clip properties	With this menu option you can open from a clip in the timeline the properties of its source clip in the bin (see section "Changing the Properties of Clips" on page 4-21).
Add track	Increases the amount of audio tracks that will be visible in the timeline area by one (see also section "Video and Audio Track Properties" on page 6-6).
Remove track	Decreases the amount of audio tracks that will be visible in the timeline area by one (see also section "Video and Audio Track Properties" on page 6-6).

6.6.3 Volume Control

The button **VOLUME** is important for audio clips. You can find it at the bottom of the timeline area to the left of the sliders to change the timeline's view. This button displays or hides the volume control lines of audio clips.

With the volume control lines you can change the volume for each clip separately. If the button **VOLUME** is in its active state, the volume control lines are visible.

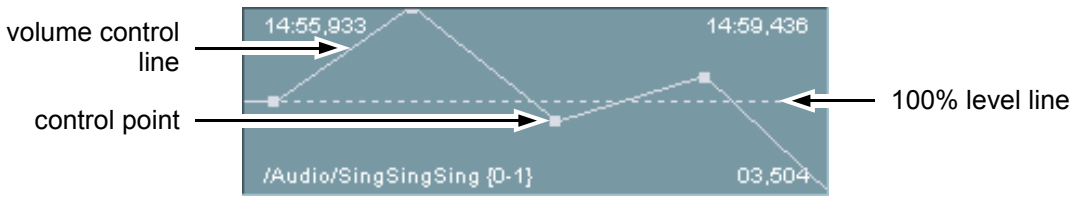


Figure 6-55: Volume control of audio

After dragging an audio clip to one of the audio tracks from the bin, the whole volume control line is set to 100% (as shown in figure 6-54 on page 6-62). In this state there may be two volume control points available, one at the beginning of the clip and one at its end.

Whether the start and end control points are available depends on whether the clip is trimmed (in- and/or outpoint adjusted).

To tune the audio volume up or down you have to either use the already available volume control points or create new ones. To create a new volume control point perform the following:

- Move the mouse cursor horizontally on the volume control line to the location where the control point should be added. As soon as you can add a control point, the mouse cursor changes to a cross.
- Then click with the mouse.

This will create a control point which can be moved in every direction on the audio clip.

The control points react to certain elements in the video and audio tracks of the timeline (snapping mode) to allow for an automated positioning. You can deactivate the snapping mode and activate a fine tuning mode by pressing the [Shift] key. Further information about the snapping mode can be found in section "Moving Clips within the Timeline" on page 6-34.

To delete a control point select from its context menu the menu option ***Remove control point*** (see also section "The Context Menu of Audio Clips" on page 6-63).

When you move the control point up or down, you can turn up or down the volume of the respective clip.

If you want to create audio peaks or fade-in or -out audio, you have to create more than one control point and set them accordingly. There is no limit in the total number of control points and new ones can be created as described above.

As an example, the following figure shows an audio project with control points set to create fades:

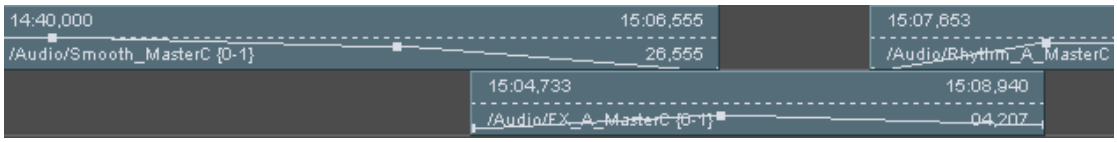


Figure 6-56: Fades achieved with the Fuze Edit Tool

To control the setting of a control point the Edit Tool shows you its current volume level in decibel via a tooltip. Simply move the mouse cursor over a control point to view its setting:

Figure 6-57: Decibel setting of control point

The decibel scale of the Edit Tool is as follows:

Decibel Indicator	Loudness (in %)
-12 dB	25%
-6 dB	50%
0.0 dB	100%
6 dB	200%
12 dB	400%

While a totally decreased control point means that audio is muted, a fully increased one does not necessarily mean that audio is set to 200%. You can move a control point beyond the limits of the audio clip which will increase the volume over 200%. This will be indicated by a shifted 100% level line: it is then located in the lower half of the audio clip.

6.6.4 Waveform Display

With the button **WAVE** you can switch on or off the waveform display of the audio clips in the timeline. You can find it at the

bottom of the timeline area to the left of the sliders that change the timeline's view, directly to the right of the button **VOLUME**.

A waveform is a graphical representation of an audio signal and the **WAVE** button displays or hides the wave forms of the audio clips:

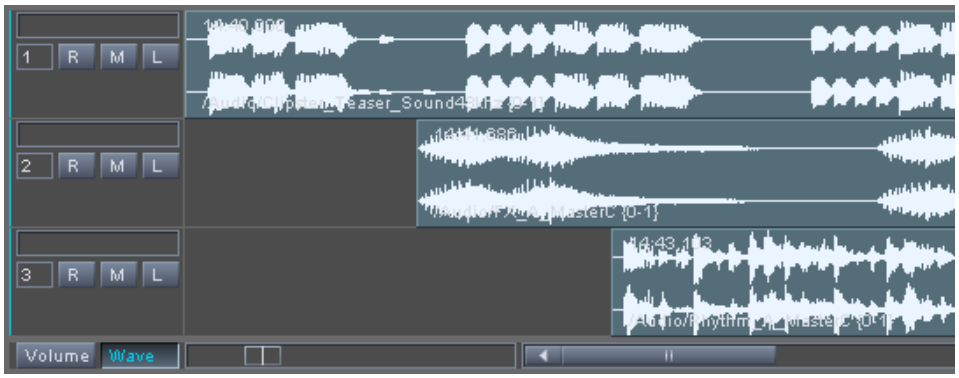


Figure 6-58: Audio waveforms

For each channel available in the respective audio clip one waveform will be displayed, i.e. a mono clip provides one waveform only whereas a stereo clip shows two waveforms, one for each channel.

The appearance of the waveforms can be configured to your liking with the Configuration Tool (see "Fuze Configurations" user guide).

6.7 Finalizing the Timeline

Once a project is finished, you can generate from a project's timeline a new clip in a configurable format and raster without affecting the original material (original data and project file are preserved). This process is called 'finalizing' and it can be made with the menu option ***Finalize...*** on the ***Project*** menu (see section "Finalize…" on page 8-10). Via this option you can select the video and/or audio format freely. Additionally, you may limit the rendering of the timeline with a defined in- and outpoint of the timeline or render video and audio separately.

After the selection of the menu option ***Finalize...*** the window **'Finalizing'** will be displayed on the screen:

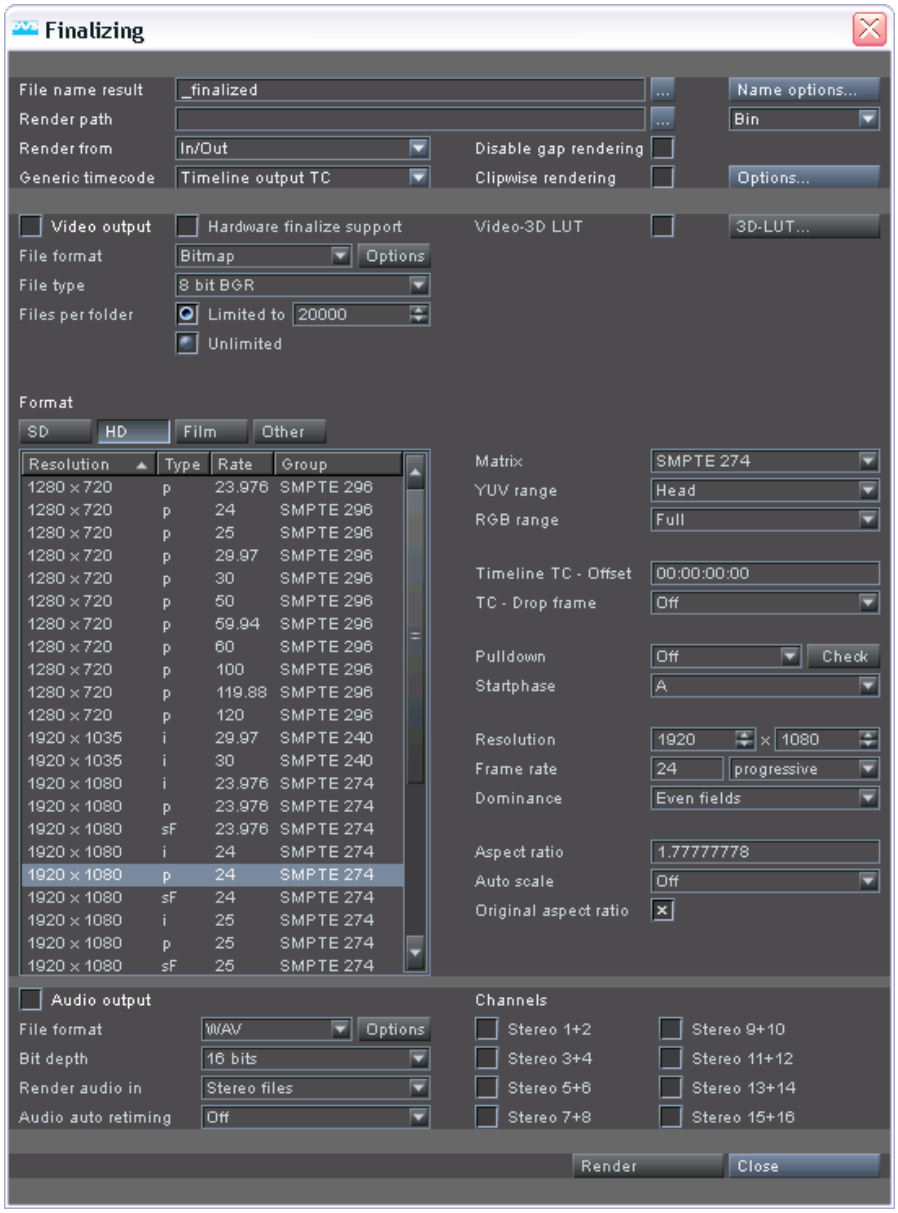


Figure 6-59: Window to finalize a project

In this window the finalizing of the timeline has to be configured. Its settings and the finalizing process in general will be described in this section.

6.7.1 General Settings

When performing a finalizing you have to specify some general settings, such as the storage information and some timeline settings, first. They can be made with the settings items at the top of the window to configure a finalizing:

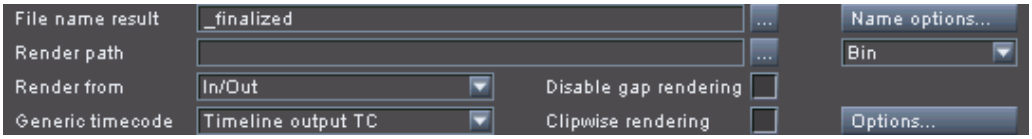


Figure 6-60: The general settings

In the entry field **File name result** enter the name of the clip to be generated. You may also click on the button to the right of this entry field (...) to select an already existing file.

Notation:	Standard file names of the Windows operating system, i.e. do not use the following characters: `% / \ : * ? " < > |` Furthermore, leave out the file extension.
Example:	`Clip`

However, instead of the entry field to set the file name you may also use the **NAME OPTIONS...** button to the right. With it you can endow the file name with variable information and/or adapt the numbering of the created image files. Further information about this can be found in section “Name Options” on page 6-79.

In the entry field **Render path** you have to state the storage path where to store the new clip. You may also click on the button to the right of this entry field (...) to select an already existing directory or create a new directory via the provided buttons of the opening dialog window. If the entered path does not exist, it will be created.

Notation:	`drive_letter:\directory\subdirectory` Instead of the backslash (\) you may also use a slash (/).
Example:	`V:\tempest\act05\scene01`

Regarding file name and path it would be sufficient for a rendering to enter a path in the field **Render path** and to state a file name. All other information necessary, such as the numbering of frames, will be added

by the DVS software automatically. For further information about this see section "The Finalized Output (Files per Folder)" on page 6-77.

The numbering of files/frames can be configured in more detail with the name options described in section "Name Options" on page 6-79.

The combo box to the right of the **Render path** items determines if and where to create bin clips for the clips to be generated. It lists the folders that are available in the bin and, if one is selected, the generated clip(s) will be automatically sorted into this folder of the bin. If audio is rendered, these clips are registered as multi-clips and further subfolders will be created, each containing the individual clips used for the audio multi-clip. The option `bin` will create the bin clip(s) in the root folder of the bin, whereas the option `none` prevents the creation of bin clips.

With the combo box **Render from** you can select whether the whole timeline (`All`) or the timeline stretch between the set in- and outpoint only (`In/Out`) should be rendered. If `In/Out` is selected but no in- and outpoint is defined in the timeline, the whole timeline will be rendered.

The check box **Disable gap rendering** determines whether gaps in the timeline of the Edit Tool will be rendered or not. It can be used in conjunction with still image formats only, meaning it will be ignored when rendering to a container file format. If deactivated, gaps present in the timeline will be rendered to black frames; when activated, they will not be rendered and the respective frames will be left out from the image sequence.

With the combo box **Generic timecode** you select the timecode type that should be written as the source timecode into the files (if supported by the file format). During finalizing the selected timecode will then be written as the source timecode to the location in the files' headers especially reserved for that kind of metadata. Afterwards the finalized clip will contain the selected source timecode and it can then be used by applications that support source timecode. The following settings are available:

`Timeline output TC`	The internal timecode of the Edit Tool's timeline is written to the correct location in the file headers, i.e. afterwards the internal timecode of the timeline is provided by the files as their source timecode.

`Source TC`	The source timecode provided by the clips already present in the timeline is written to the files' headers as their source timecode, i.e. if the clips already provided source timecode, it will be preserved. Clips without source timecode information may receive a virtual source timecode (see section "Notes on Source Timecode and Keycode" on page 2-12).

The DVS software supports source timecode in several file formats (see section "Notes on Source Timecode and Keycode" on page 2-12). To use the combo box **Generic timecode** the **File format** combo box has to be set to one of these file formats.

The **Clipwise rendering** items can be used, for example, to create digital deliverables. With them you can finalize the clips of the timeline to individual clips on the storage. When the check box is activated, for every clip in the timeline an individual clip in the selected file format will be created. In addition a corresponding Avid Log Exchange (ALE) file can be created which can be enabled/disabled as well as configured further with the **OPTIONS...** button to the right of the check box.

The reel name(s) that should be output during finalizing (e.g. via the name options or written to file headers) can be configured in the Configuration Tool.

6.7.2 Configuring Video

With the settings items in the middle of the finalizing window you can specify the video format for the rendering of the new clip. To make these available, the check box **Video output** has to be activated.

With the finalizing function of the Edit Tool you are able to generate video and audio files together or separately via the check boxes. When calling the finalizing window for the first time, the items for video and audio are disabled. Via the check box **Video output** at the top of this area you can enable the items for video and thus decide that you want to generate a video clip. The same can be done with the check box **Audio output** (see section "Configuring Audio" on page 6-75). By turning on either one of these only the activated output will be created.

If a container format is selected as the file format (e.g. `Windows Media`), you cannot generate audio and video separately. Both will automatically be included in the created file.

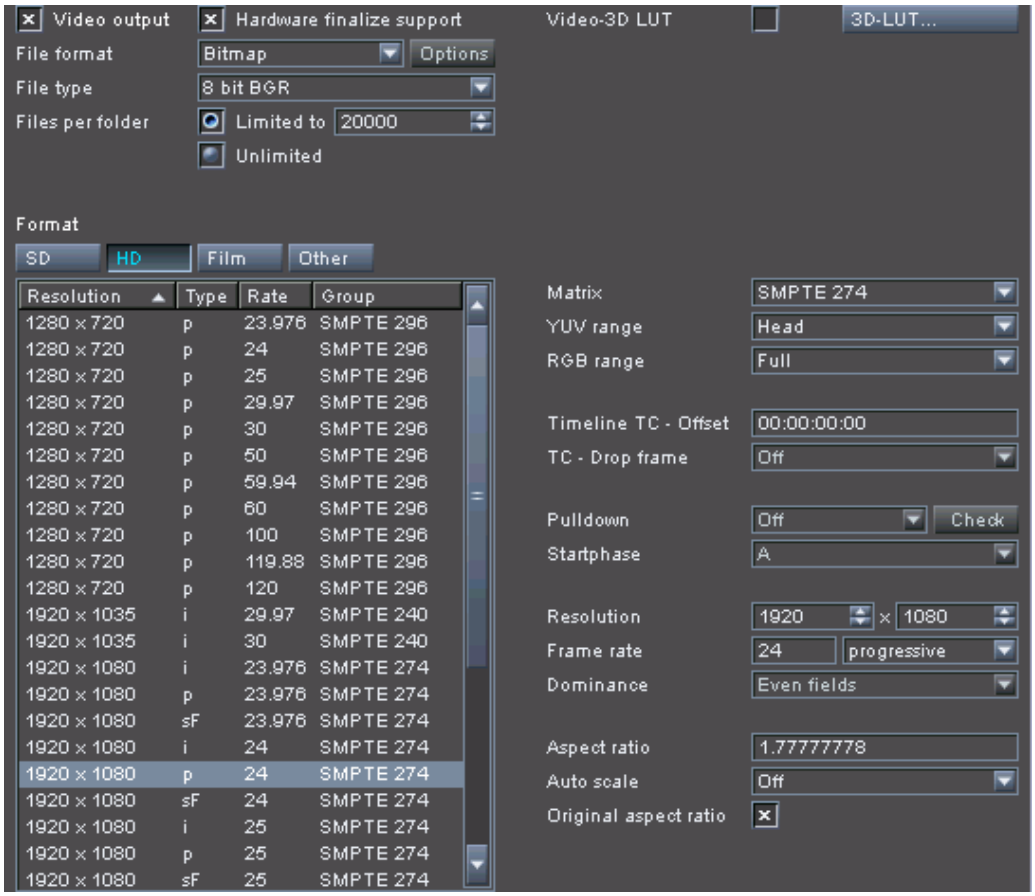


Figure 6-61: Configuring video

To the right of the check box **Video output** you can find the **Hardware finalize support** check box. With it you activate or deactivate the support of the DVS PCI video board during finalizing. When activated and if possible, the video files will be rendered in hardware in a render speed faster than real time (depends on the applied operators and video formats involved). All real-time effects are supported. When deactivated, the finalizing will be made in software.

When finalizing to QuickTime, the available file types depend on whether the **Hardware finalize support** check box is activated or deactivated. 2K resolutions or above are supported when the **File type** combo box is not set to `QuickTime Conversion`.

With the **File format** combo box select the file format for your clip to be generated. For a list of the supported file formats see section "Supported File Formats" on page A-9. To the right of the **File format** combo box you can find the button **OPTIONS** which provides, depending on the selected format, further configurations for the files to be generated.

Depending on the selected file format additional codec or file types may be available (to determine bit depth and/or byte order settings). If provided by the format, select from the **File type** combo box the desired

additional codec or file type. A list of the file types can be found in the "Fuze I/O Tool" user guide.

The items **Files per folder** allow you to limit the number of files that will be stored in one directory. Further information about this can be found in section "The Finalized Output (Files per Folder)" on page 6-77.

The **Video-3D LUT** items are optionally available. They are identical to the 3D LUT settings available for the timeline. A 3D LUT will not be applied automatically to the rendered files, even if one is set for the output of the timeline. In case you want to apply a 3D LUT (most probably the same you have set for the timeline), you have to select it here and activate it with the respective check box. For further information about how to do this refer to section "Loading and Applying a 3D LUT File" on page 6-17.

On the left side of the area to configure video you can find some buttons and a list box to select one of the various video formats that the DVS system provides. Choose one of the video format type buttons to display in the list box below the video formats sorted under this type. Then select from the list box the desired format that the project's timeline should be rendered to. The selected format will also be shown on the right side of the video configuration area in the editable resolution fields and, if appropriate, the pulldown/drop frame items will be made available.

With the **Matrix** setting you determine the color conversion matrix that should be used if conversions between different color spaces and/or scalings between different value ranges are necessary. Usually, with a video format in SD `CCIR 601` and with a video format in HD `SMPTE 274` is selected.

If you have selected a YUV format as the file format, the **YUV range** setting has to be applied. It specifies whether the color space range of the finalized clip will be in a restricted (`Head`) or in a full value range (`Full`). The same applies to the **RGB range** setting: If you have selected an RGB file format, this setting will be evaluated. It specifies whether the color space range of the finalized clip will be in a restricted (`Head`) or in a full value range (`Full`).

Further information about color space ranges and color space conversions can be found in the "Fuze Configurations" user guide.

In the field **Timeline TC - Offset** select a timecode/frame offset for the rendered clip. It will be evaluated if for the clip to be generated a file format is selected that stores source timecode information in its header (e.g. *`*.dpx`*). Then the clip will provide this timecode offset in its source timecode.

If appropriate and available select whether drop-frame timecode should be applied to the source timecode written to the files with the **TC - Drop frame** combo box. It will be evaluated if for the clip to be generated a file format is selected that stores source timecode information in its header (e.g. *.dpx). Further information about drop-frame timecode can be found in the "Fuze Configurations" user guide.

If appropriate and available, select the necessary pulldown method from the **Pulldown** and **Startphase** combo boxes. The pulldown feature may be necessary when working with film-originated material and offers a film-to-NTSC conversion: It renders, for example, video data that is in 24 progressive frames/sec. (film) as 30 interlaced frames/sec. (NTSC).

To use this feature the video track(s) of the timeline should contain 24p material only. With the **CHECK** button to the right you can ascertain that all material in the timeline is in this format. Prior to using pulldown it is recommended to check the timeline with this button.

Further information about the pulldown settings and pulldown in general can be found in the "Fuze Configurations" user guide.

With the fields regarding the resolution of the rendering you set the actual output resolution of the clip to be rendered and generated. As the fields indicate, you can alter the resolution to any format you like and the new clip will be present in this resolution. Use the **Resolution** fields to change the height and width of the clip.

The **Frame rate** entry field will be evaluated if a file format is selected that stores source timecode information in its header (e.g. *.dpx). Then the specified timecode will provide the entered frame rate as the source timecode's frame rate.

Use the combo box for the field mode to select whether your material to be generated should be interlaced, progressive or segmented frames.

From the combo box **Dominance** select the dominance of your interlaced material. The `Odd fields` value starts with the second video field of the interlaced image while the value `Even fields` begins with the first video field.

Via the entry field **Aspect ratio** you can change the aspect ratio of your image content and thus compress or stretch the image. The aspect ratio value should be entered as the value of the x-axis divided by the y-axis.

Aspect ratio: `x/y`

The **Auto scale** and **Original aspect ratio** items enable you to scale and resize your original video material. Both settings are concerned

with the video format of the clips in the timeline, and their output for the clip to be rendered must be seen in relation to the selected video format of the new clip:

– With the combo box **Auto scale** set to `Fit` and the **Original aspect ratio** check box activated, the clips of the timeline will be scaled to their maximum allowable width or height so that no information gets lost. If the aspect ratio is different, you will receive black bars in the finalized images.
– With this combo box set to `Crop` and the **Original aspect ratio** check box activated, the images will be scaled to their maximum allowable width or height so that you receive a full image at the output. If the aspect ration is different, parts of the images may be cropped.
– With the **Auto scale** setting set to `Off`, the material will maintain its original size.
– With the combo box **Auto scale** set to `Fit` or `Crop` and the **Original aspect ratio** check box deactivated, the aspect ratio (the relation of width (x) and height (y) of the video format) will not be preserved. The resulting images will be stretched or compressed if the aspect ratio is different and you will always receive a full image at the output.

More details about autoscaling in combination with aspect ratio can be found in the "Fuze Configurations" user guide.

6.7.3 Configuring Audio

The settings items at the bottom of the finalizing window allow you to configure a finalizing of audio. To make them available the check box **Audio output** has to be activated.

With the finalizing function of the Edit Tool you are able to generate video and audio together or separately if desired: Simply select the appropriate output check box (see also section "Configuring Video" on page 6-71).

If a container format is selected as the file format (e.g. `Windows Media`), you cannot generate audio and video separately. Both will automatically be included in the created file.

Figure 6-62: Configuring audio

With the **File format** combo box select the file format of your audio file(s) to be generated. For a list of the supported file formats see section "Supported File Formats" on page A-9. To the right of the **File format** combo box you can find the button **OPTIONS** which provides, depending on the selected format, further configurations for the files to be generated.

From the **Bit depth** combo box select the bit depth of the audio files. The DVS software supports all common bit depths (depending on the selected file format).

Use the **Render audio in** combo box to determine the output format of your files, i.e. whether they should be rendered to individual mono or stereo files, or a single file containing multiple channels (depending on the selected file format).

Audio that is available in the timeline can be re-timed (i.e. time stretched or time compressed) between different frame rates (e.g. 23.976 Hz, 24 Hz and 25 Hz). For this select from the **Audio auto retiming** combo box the appropriate option. When activated a retiming will be performed automatically during finalizing with respect to the frame rate of the selected video format. However, please note that this feature provides no pitch control and should therefore be used for slight timing changes only.

With the check boxes of the area **Channels** you have to select audio channels for the output. The stereo channel check boxes of this area are directly related to the audio channel output settings of the timeline (see section "How to Configure the Audio Output" on page 6-13): They will render whatever audio track is set to the respective output channels:

Example:		
The audio track 5 and 6 of the Edit Tool contain each audio with different contents. Both tracks are configured to an output of channel 1 and 2. In the **'Finalizing'** window select the channels 1 and 2 for an audio file generation. This will result in an audio file that contains the mixed contents of the audio tracks 5 and 6.		
Audio track of Edit Tool	5	6
Output path of tracks	channels 1 + 2	channels 1 + 2
Output settings in **'Finalizing'** window	channels 1 + 2	
Results in file containing …	… the mixed contents of audio track 5 and 6	

6.7.4 Finalizing

The buttons at the bottom right-hand side of the window **'Finalizing'** allow you to control this window:

Use the button **RENDER** to start the finalizing process. It will be available as soon as the necessary information are set, such as output type, storage information and format.

Then the **'Finalizing'** window will be closed and the tool area of the DVS software will switch to the job list automatically (see section "Jobs" on page 4-29). Additionally, the state of the rendering process will be indicated by a progress bar. As soon as it reaches 100%, the process will be finished and the window with the progress bar will be closed. You can then access the generated clip(s) on your storage as well as in the bin (depending on your settings).

With the button **CLOSE** you can close the **'Finalizing'** window without starting a rendering process. You will then return to the main window of the DVS software. However, already made settings in the **'Finalizing'** window will be stored.

6.7.5 The Finalized Output (Files per Folder)

The result (output) of a finalizing depends to some extent on the setting of the **Files per folder** items. They allow you to configure the number of files that will be stored in one directory.

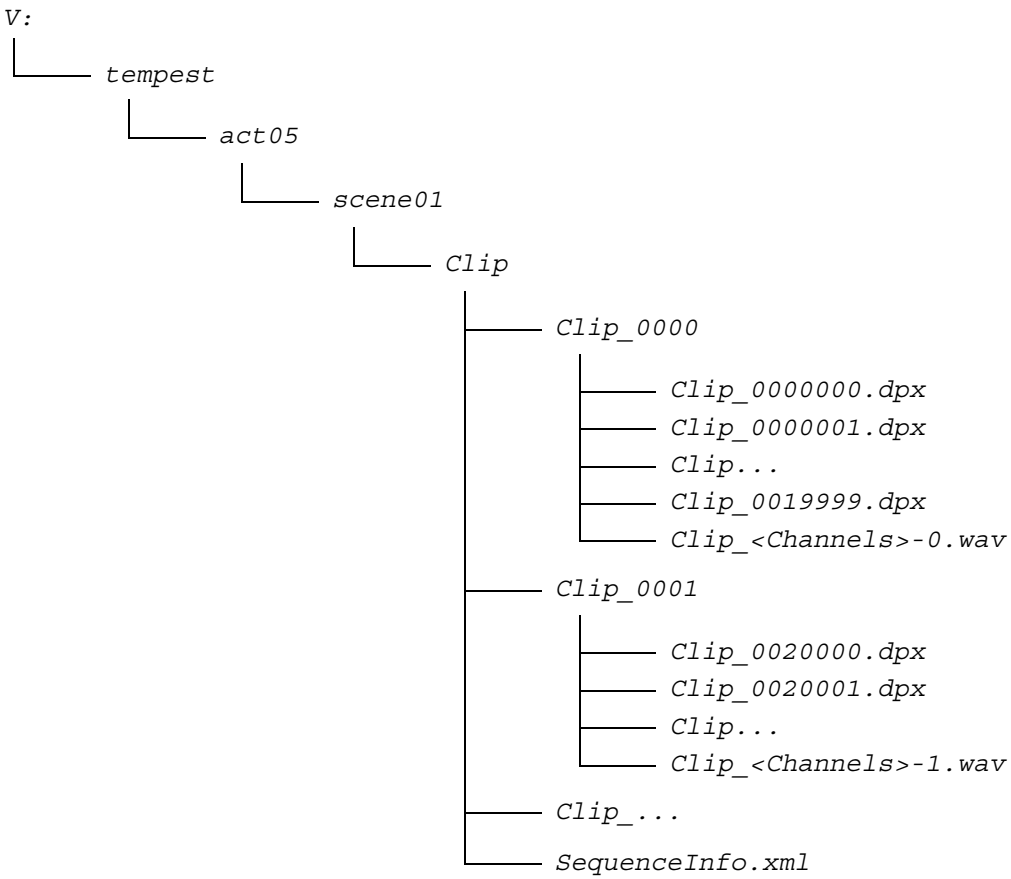
Figure 6-63: The files per folder items

By default the files per folder items are set to 20,000 frames because this is an appropriate value for the file system of the operating system. Values below 1,000 files cannot be set. By activating the **Unlimited** setting no further subdirectories will be created and the rendered files will all be stored in the first generated subdirectory as described below.

Windows may cause problems if more than 20,000 files are stored in one directory.

Use the **Unlimited** setting only when you are sure that your rendering causes less than 20,000 frames.

With the files per folder items set to 20,000 our examples given in section “Configuring Video” on page 6-71 and section “Configuring Audio” on page 6-75 would lead to the following output on the storage when as the video output format the *.dpx file format were selected and for audio the *.wav file format:



In the path V:\tempest\act05\scene01 a directory will be created carrying the name Clip. Beneath it a subdirectory will be created with the name Clip_0000. In this subdirectory the first 20,000 frames of the finalizing will be stored.

The file name of the first frame of your rendered timeline will be Clip_0000000.dpx. The number in the file name will increase by one with every generated frame (file/frame number). If the 20,000th frame is reached, the Edit Tool will again create a subdirectory (Clip_0001) in the selected path and start the generation of the next 20,000 frames, and so on until the project is rendered completely according to your settings.

The file/frame numbering can be configured with the name options items (see section “Name Options” on page 6-79). Normally the count will start with 0 with the amount of digits depending on the amount of frames to be finalized.

The matching audio files will be stored in these subdirectories as well, meaning the audio files will be appropriately cut to match the length of video stored in this folder. The place holder `<Channels>` in the file names of the audio files above indicates the selected audio channels of the area **Channels** when individual mono or stereo files are created. Then for each enabled check box one file will be created. When a file with multiple channels is generated, the `<Channels>` place holder will be left out.

When video (still image sequence) or audio clips are finalized or recorded, an additional file with the name *SequenceInfo.xml* is created in the main directory of the clip. It is used by the DVS software to enable a recognition of multi-clips with different **Files per folder** settings, for example, during a drag-and-drop procedure to the bin.

For further information about multi-clips see section "Details about Clips" on page 4-10.

If a container format is selected as the file format, the file will be stored in the main directory, i.e. under *Clip*.

6.7.6 Name Options

In the DVS software you can receive during a finalizing variable information in file names via the **NAME OPTIONS...** button.

The name options allow you to write certain details of your files to be created to the file names automatically. With them you can provide the file names with information such as the following:

- Project name
- Video format
- Resolution
- Frame rate
- Color space
- Bit depth
- Aspect ratio
- File format
- File type
- Sampling rate
- Date
- …

Additionally, with the name options you can adapt other name related options such as the numbering of the individual image files.

To configure the name options you have to perform the following:

- Click on the button **NAME OPTIONS...** in the finalize dialog.

This will open the following window:

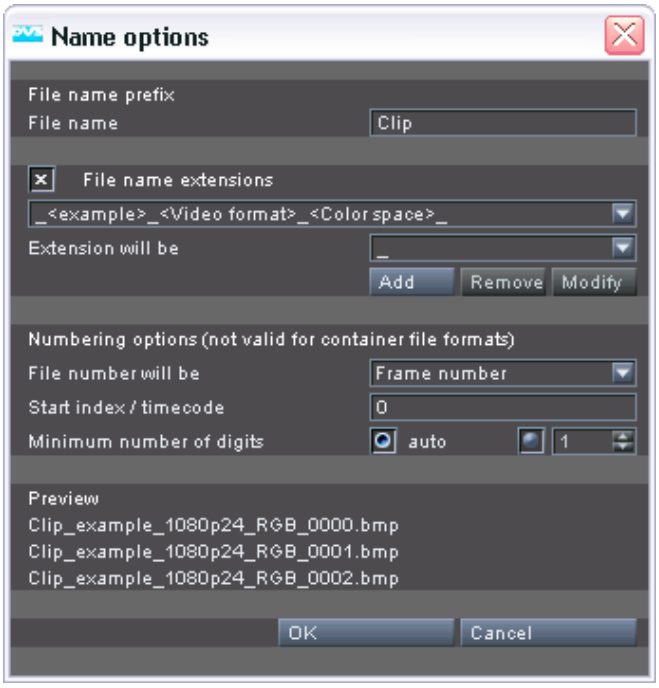


Figure 6-64: Options to configure a variable file naming

To set the name options perform the following:

- If not already set as desired enter a file name prefix in the entry field **File name**.
- By activating or deactivating the **File name extensions** check box you can add variable and/or static components to the file names:

combo box	The upper combo box is used to assemble the file name extensions. By positioning the cursor or marking variables/separators via a double-click of the mouse in this field, the extensions can be assembled or edited using the items described below. Additionally, the drop-down list of this combo box provides some predefined extensions. The last ten assembled and confirmed name extensions can be found here as well. They will be available for the duration of the project and saved together with the project file.

Extension will be	Select from this combo box the variable or separator that should be transferred to the upper combo box. The variables will be replaced during the operation with the respective data. If none is available, 'Unknown' will be output. The variable `Customized` can be used for user-defined strings: With `Customized` selected the user-defined string can be entered in this combo box and then transferred to the upper one with the button **ADD**.
ADD	Use this button to transfer the selected extension to the upper combo box. It will be inserted at the current cursor position.
REMOVE	By double-clicking (marking) variables or separators in the upper combo box they can be deleted with this button. To delete extensions even without marking, you may also use the respective keys on your keyboard, i.e. [Backspace] and [Del].
MODIFY	This button will be available when a user-defined string (variable `Customized`) is double-clicked (marked) in the upper combo box. Then you can edit the text of this string in the field **Extension will be**. When finished, the marked extension in the upper combo box can be replaced with be edited text by clicking the **MODIFY** button. The other variables can be modified by double-clicking them in the upper combo box and selecting another one from the combo box **Extension will be**.

- Use the **Numbering options** to configure a file numbering for the image files to be created:

File number will be	Select from this combo box what should be used to create the file numbers. You can select between a consecutive numbering of frames, the internal timecode of the Edit Tool or the timeline's output timecode. When using one of the timecode settings the respective timecode will be recalculated in frames. This value is then used for the numbering.

Start index/time-code	When `Frame number` or `Internal TC` is selected in the combo box **File number will be**, you can enter in this field the starting point for the numbering, i.e. with it you can offset the frame number in the file names of the image files. It can be entered either in frames or timecode notation depending on the selected **File number will be** setting.
Minimum number of digits	With these radio buttons you can determine the minimum amount of digits that the numbering should provide. Either you let the DVS software decide how many digits the file numbering should provide (**auto**) or you set it manually with the entry field to the right.

A preview of the file name can be seen below the items to set a numbering. For example, when as a file name prefix `scene` is entered and as the file extension `_<Date>_<Video format>_<Color space>_` is specified with a 5-digit numbering, you may receive an output like the following:

```
scene_20090101_1080p24_RGB_00000.dpx
scene_20090101_1080p24_RGB_00001.dpx
scene_20090101_1080p24_RGB_00002.dpx
scene_20090101_1080p24_RGB_00003.dpx
...
```

- Once the file names are set as desired click the **OK** button.

This will close the window to configure the name options and you will be returned to the finalize dialog.

With this the configured file naming will be detailed in the finalize dialog accordingly (entry field **File name result**). When the **File name extensions** were activated via their check box in the name options, the field **File name result** will be unavailable. The set name options will be applied to the generated files as soon as the rendering is initialized.

Timeline Element Properties

Timeline element properties are provided for video clips as well as transitions. They can be used to determine the appearance of the respective element in the timeline further. While with the properties of a transition you can, for example, set the type of wipe used for the transition, with the ones for a video clip you can add effects operators to the clip.

The effects operators of video clips provide you with additional editing features for your video processing tasks. However, they may be part of optional packages.

This chapter describes the timeline element properties in detail. First, it will be explained how to access the properties, followed by an explanation of the items that are available in the properties area for all timeline elements. After that it is described how to close the area of the timeline element properties to return to the view of the audio tracks again. The chapter will be concluded with a description of the timeline element properties for each timeline element in detail. Following the section dealing with the properties of video clips you can find, each in a section of its own, the explanation of all available effects operators.

7.1 Accessing the Timeline Element Properties

The properties of timeline elements can be accessed easily in the Edit Tool. They will be shown instead of the visible audio tracks right below the timeline area in an area of their own. To make this area visible perform the following:

- Double-click the respective timeline element in the timeline with the mouse.

The properties area will be displayed right below the timeline area instead of the audio tracks. It will show you immediately the properties of the selected element where the context menu was invoked:

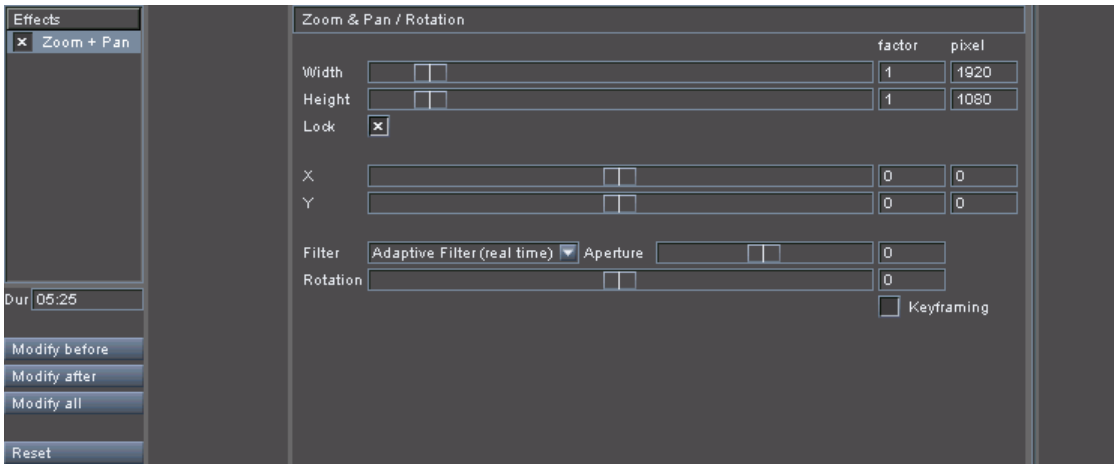


Figure 7-1: Video clip properties

With the timeline element properties area visible in the user interface, you can display the properties of every timeline element as soon as it is selected in the video track. Thus fast editing operations can be performed easily in the Edit Tool without laboriously calling the properties of each element again.

To view changes to an effect with the overlay of the control area immediately make sure that the timeline cursor is positioned on the clip where the effect was added.

7.2 General Items of the Properties Area

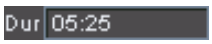
This section explains the items that are available in the properties area for all timeline elements.

Depending on the type of element selected from the timeline not all items may be available. If they are dimmed, they cannot be used in conjunction with this timeline element.

Once the timeline element properties are visible beneath the timeline, you can find to the left side the following elements:

Figure 7-2: General items of the properties area

If available and not dimmed, they can be used together with this timeline element. In detail they perform the following:



With the **Dur** field you can change the length of the selected timeline element frame accurately. Simply type in the desired length (duration) of the timeline element and confirm your entry with the [Enter] key. After this the outpoint of the selected element in the timeline will be altered and it will take on the adjusted length. Whether the material succeeding the timeline element in the timeline will be preserved and moved accordingly depends on the state of the insert/overwrite mode of the Edit Tool (see section "Insert/Overwrite Mode of the Timeline" on page 6-30). Further information about timecode/frame number entry fields can be found in section "About Timecode / Frame Number Fields" on page 2-14.

This button applies the settings of the currently selected timeline element or, with video clips, of the currently selected and displayed effects operator to all elements of the same type that precede it in this track of the timeline.

The button **MODIFY AFTER** applies the settings of the currently selected timeline element or, with video clips, of the currently selected and displayed effects operator to all elements of the same type that succeed it in this track of the timeline.

The button **MODIFY ALL** applies the settings of the currently selected timeline element or, with video clips, of the currently selected and displayed effects operator to all elements of the same type in this track of the timeline.

With the **RESET** button you can restore the default settings of the currently selected timeline element or, with video clips, of the currently selected and displayed effects operator with a single click.

Effect settings for video clips can also be applied to individual clips by using preset effects (see section “Creating Preset Effects” on page 4-23 and section “Using Preset Effects” on page 4-25).

7.3 Changing Values of Sliders and Entry Fields

Almost all operators provide sliders as well as entry fields to adjust their effects. You can adjust their values and settings in several ways:

1. Select a slider with the mouse and move it to the left or right (up or down) to the desired settings.
2. Use the [Up Arrow]/[Down Arrow] keys after the selection of one of the settings by clicking in its entry field to step the value up or down.
3. Use the scroll wheel of your mouse after positioning the mouse cursor over a slider to step up or down the value.
4. Enter in an entry field the desired setting and then press [Enter] on your keyboard.
5. Place the mouse cursor over an entry field and use the scroll wheel of your mouse to step up or down the value.

In most of the above mentioned cases you can in- or decrease the stepping value that will be used for the adjustments by pressing the [Ctrl] key to increase or the [Shift] key to decrease the stepping value. Furthermore, with a double-click of the mouse on a slider field you can on most sliders reset its setting to its default value.

7.4 Closing the Timeline Element Properties

The timeline element properties can be closed the same way they are called. After this the view of the audio tracks will be restored. To close the timeline properties area perform the following:

- Double-click a timeline element in the timeline.

This will close the properties area and afterwards the audio tracks will be visible again in the user interface of the Edit Tool.

7.5 Properties of a Transition

As soon as a transition is selected in the timeline, its properties are displayed in the timeline element properties area right below the timeline area.

If the properties area is not visible in the Edit Tool, you have to display it first (see section “Accessing the Timeline Element Properties” on page 7-2).

By default a transition is set to the wipe `Crossfade`. This can be changed via the properties of a transition easily:

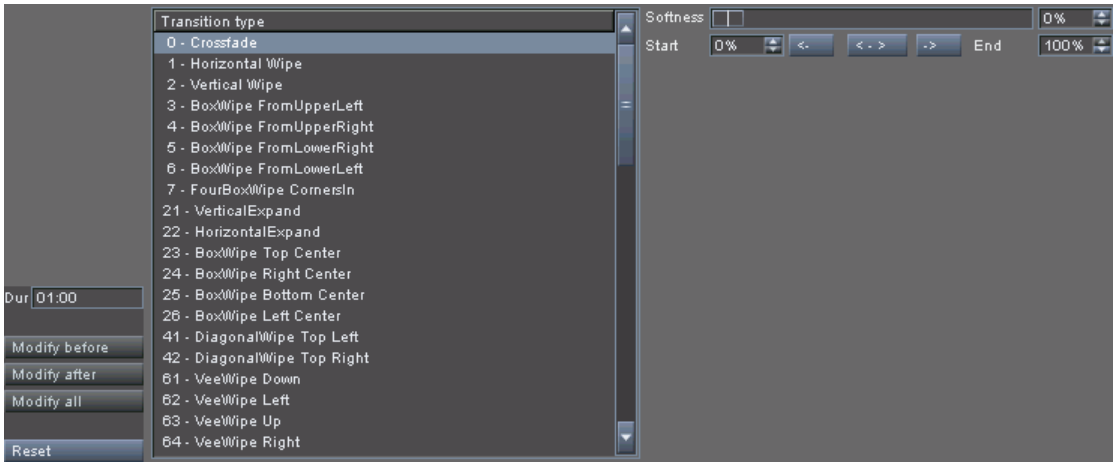


Figure 7-3: Transition properties

In the properties of the transition you can select another wipe for the transition than the default one from the **Transition type** list box. The following lists the transitions that are currently implemented. The numbers indicate the SMPTE number which are provided in the **Transition type** list box as well:

The graphics show the effects of the respective wipe and, if not reversed, the transition occurs towards the (increasing) white area.

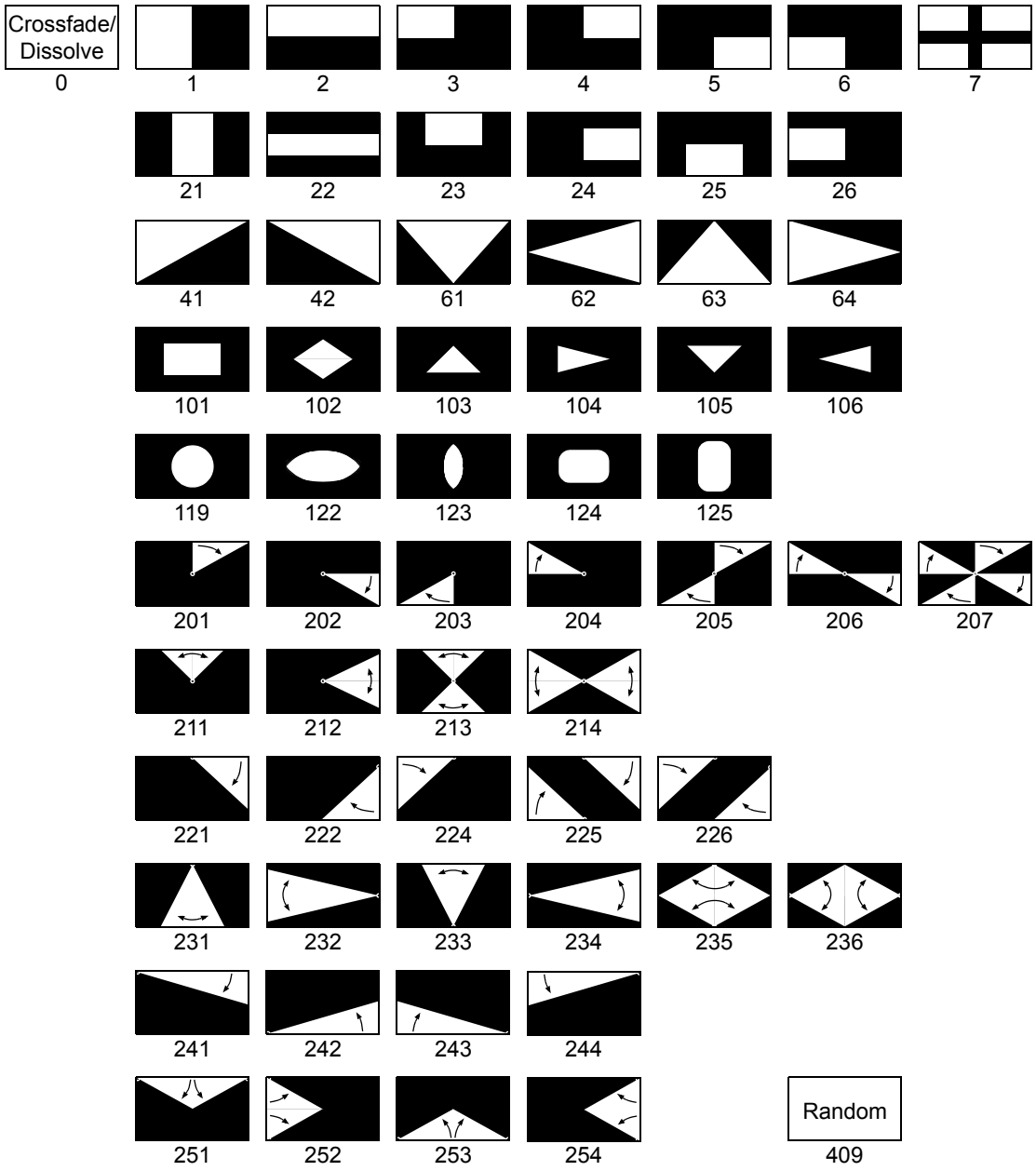


Figure 7-4: SMPTE wipes of the DVS software

After selecting one of the available wipes you have further possibilities at hand to adjust the transition:

Item	Description
Softness	Use the **Softness** slider and the percentage value to its right to adjust the softness (feathering) of the wipe. Then the edges of the emerging image appear softer so that they blend into the receding image with less contrast. With the slider you can set the softness to values between 0 and 100%. However, with the percentage value to the right of the slider you can select values even greater than 100%: Use the controls to the right of the entry field to step the value up or down until it is set as desired.
Start	The **Start** entry field indicates in percent the starting point of the transition. If adjusted, the operator will begin the transition at a later point of its phases to blend into the receding image. If this value is greater than the value set in the **End** entry field, the transition effect will be reversed, i.e. a change will appear towards the (increasing) black area (see graphics in figure 7-4 on page 7-8).
<-	This button transfers the value set in the **End** entry field to the **Start** entry field (from right to left).
< - >	This button exchanges the values between the **End** and **Start** entry fields. The value of the **End** entry field will be transferred to the **Start** entry field and vice versa.
->	With this button you can transfer the value set in the **Start** entry field to the **End** entry field (from left to right).
End	The **End** entry field indicates in percent the ending point of the transition. If adjusted, the operator will conclude the transition at an earlier point of its phases to blend into the receding image. If this value is less than the value set in the **Start** entry field, the transition effect will be reversed, i.e. a change will appear towards the (increasing) black area (see graphics in figure 7-4 on page 7-8).

As soon as an item of the transition properties is altered its effect is immediately applied to the selected transition between two clips. Once the transition properties are set, you can, for example, review the transition and evaluate its effect easily with the button **REVIEW** of the controls (see section “Controls” on page 5-11).

7.6 Properties of a Video Clip

Every video clip added to the timeline provides timeline element properties which offer you additional editing features for your work. These editing features can be accessed in the form of effects operators.

Depending on its optional features, DVS provides for the Edit Tool various operators that enhance the editing functionality of the DVS software. The following operators are available:

Effects Operator	Availability	Description
Zoom + Pan	default	Allows, for example, to set zooming and/or panning for the video clip in the timeline. It is by default available for all clips in the timeline.
1D-LUT	default	Operator to assign a static look-up table (LUT) to a video clip for color and/or gamma correction.
Subtitling	default	Part of the 3D/stereoscopic workflow option. See the "Fuze 3D/Stereoscopy" supplement user guide.

Usually, effects operators are applied to single clips on the timeline only but their settings can be transferred to other clips of the timeline easily (see section "General Items of the Properties Area" on page 7-3).

This section explains in detail the possibilities when dealing with the properties of a video clip.

The operators offered by DVS will be described in detail in the sections following this one.

7.6.1 Adding Effects

As soon as a video clip is selected in the timeline, its properties are displayed in the timeline element properties area right below the timeline area. Then the clip is ready to receive an effects operator.

If the properties area is not visible in the Edit Tool, you have to display it first (see section "Accessing the Timeline Element Properties" on page 7-2).

To the left of the timeline element properties area you can find the **Effects** list of the selected clip. It contains a list of all effects operators that are currently applied to the clip:

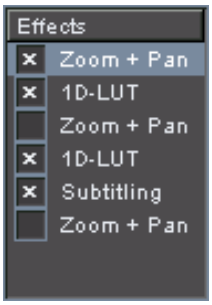


Figure 7-5: Effects list of a video clip

The effects operator 'Zoom + Pan' is by default available for all video clips in the timeline and thus is already available in the effects list of the timeline element properties. However, the same effect with different settings as well as additional effects can be applied to the clip.

To add an effect to a clip in the timeline perform the following:

- If appropriate, activate the tab **Effects** in the tool area of the Edit Tool (see section "Effects" on page 4-22 for further information about this tab).
- Select from one of the folders the respective effects operator that you want to apply and drag and drop it to the **Effects** list of the timeline element properties:

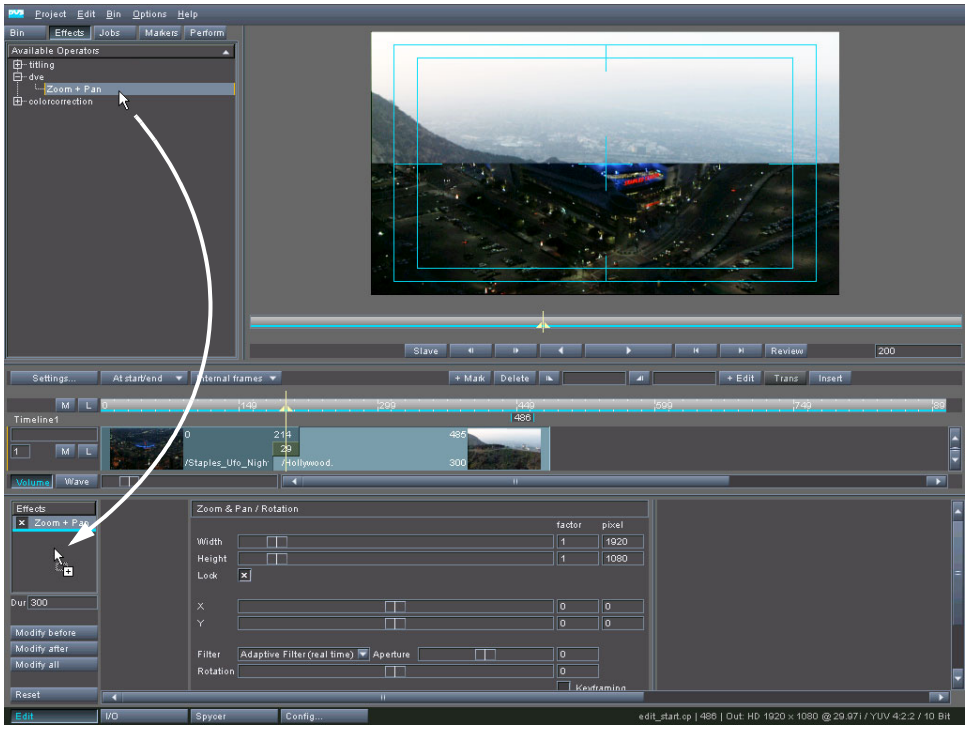


Figure 7-6: Drag and drop of effect

This will apply the selected effect to the clip whose properties are displayed in the area of the timeline element properties. Its settings controls will be made available in the settings pane to the right where you can then perform the desired adjustments (see section “Altering Effect Settings” on page 7-12).

Some effects operators or combination of operators are not real-time capable. Prior to a play-out their application has to be rendered (see section “Prerendering of Timeline Elements” on page 6-41).

To delete an applied effect from the effects list of the clip in the timeline you can select the respective effect and press the key [Del] on your keyboard.

7.6.2 Altering Effect Settings

With the timeline element properties area you can set the properties of a video clip via the available effects operators. The effects added to a video clip in the timeline can be accessed easily with the effects list to the left:

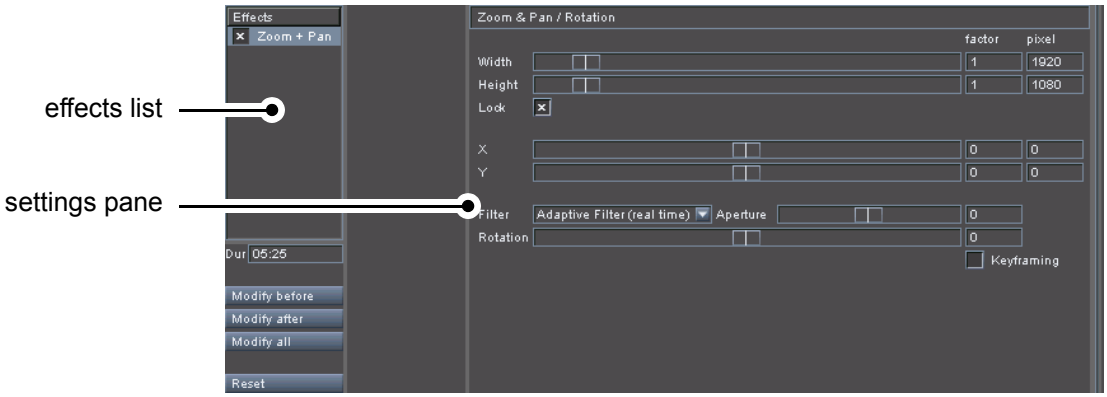


Figure 7-7: Video clip properties

Simply select an effect from the effects list and its settings are immediately displayed in the settings pane to the right of the list. Then they can be altered according to your liking and the changes are directly applied to the clip in the timeline.

The individual settings possibilities of the effects operators developed by DVS are explained in the later sections of this chapter. For a description of operators developed by third parties please refer to their respective documentation.

To view changes to the effects immediately with the overlay of the control area make sure that the timeline cursor is positioned on the clip currently selected in the timeline.

With the check boxes in front of the effects operators available in the effects list you can enable or disable effects. If a check box in front of an effect is activated, it is enabled; if it is deactivated, it is disabled. Thus you can easily evaluate the outcome of an individual effect by comparing it with the original image or other applied effects.

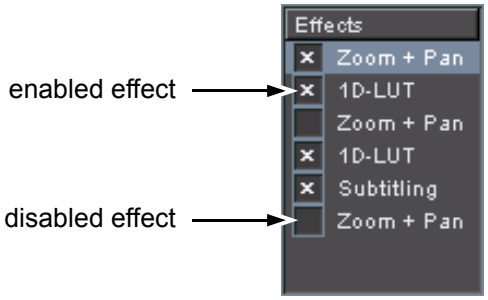


Figure 7-8: Enabling or disabling effects of a video clip

If you need an operator to be applied to a limited range of frames of a clip only, you have to edit the clip with hard cuts beforehand because the applied effects are valid for a whole timeline clip always.

Some effects operators or combination of operators are not real-time capable. Prior to a play-out their application has to be rendered (see section "Prerendering of Timeline Elements" on page 6-41)

The sequence of all added effects to a clip that are listed in the effects list is important as well. They are applied top to bottom, i.e. the effect at the top of the list will be applied first to the clip followed successively by the rest of the added effects. This may be especially important when applying the same effect type several times. You can change the sequence of the effects in the effects list easily via drag-and-drop. Simply select one effect and drag it to the desired position within the list.

An effect can be deleted from the effects list of a clip the same way you delete a clip from the timeline. Just select the effect from the effects list in the timeline element properties and press the key [Del] on your keyboard or select from its context menu the menu option ***Delete***.

To apply the same effect settings to other clips in the timeline you can either use the general items to the left of the timeline element properties area (see section "General Items of the Properties Area" on page 7-3) or use preset effects as described in section "Effects" on

page 4-22 and section “Using Preset Effects in the Properties Area” on page 7-14.

When transferring settings to other clips in the timeline (e.g. via the 'modify' buttons), only the settings of the currently selected operator are copied. In case you want to apply the settings of another operator to clips in the timeline, you have to select it in the effects list and perform the same procedure again.

7.6.3 Using Preset Effects in the Properties Area

To apply the same effect settings of one clip to another the adjusted effect's settings in the timeline element properties can be created as an independent effect easily. Afterwards they can be applied to other clips on the timeline without any problem.

To create such a preset effect as well as apply it to a selected clip in the timeline you may use the context menu of an effect in the effects list.

Further information about preset effects and, for example, other ways to create and apply them as well as how to use them for several projects, can be found in section “Effects” on page 4-22.

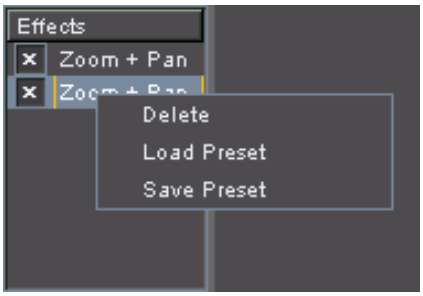


Figure 7-9: Context menu of the effects list

The context menu of an effects operator in the effects list provides the following menu options:

Delete This menu option deletes the respective effect where the context menu was invoked from the effects list. After this its effect is removed from the clip in the timeline. Alternatively, you can select the effects operator and press the [Del] key on your keyboard.

Load Preset The ***Load Preset*** menu option enables you to load the settings of a preset effect to the respective effects operator. After the selection of this menu option a dialog window opens where you have to select the wanted preset effect from a list. Once this is confirmed with the **OK** button, the settings of the preset effect will be applied to the selected effects operator.

Save Preset This menu option creates a preset effect of the effect where the context menu was invoked. After its activation a dialog window opens where you have to enter a name for the preset effect. Once this is confirmed with the **OK** button, the preset effect will be created as a 'subeffect' under the respective effect in the tool area's effects pane. Then it can be used easily to apply the same effect setting over and over again for different clips in the timeline, for example, with the ***Load Preset*** menu option (see above).

7.7 The Operator 'Zoom + Pan'

The operator 'Zoom + Pan' allows to zoom, pan and rotate as well as to sharpen or blur the contents of the video clip in the timeline. It is by default available and active for all clips in the timeline and thus the first operator visible in the timeline element properties area after it has been accessed.

For this effect keyframing is available (see section “Keyframing” on page 7-21).

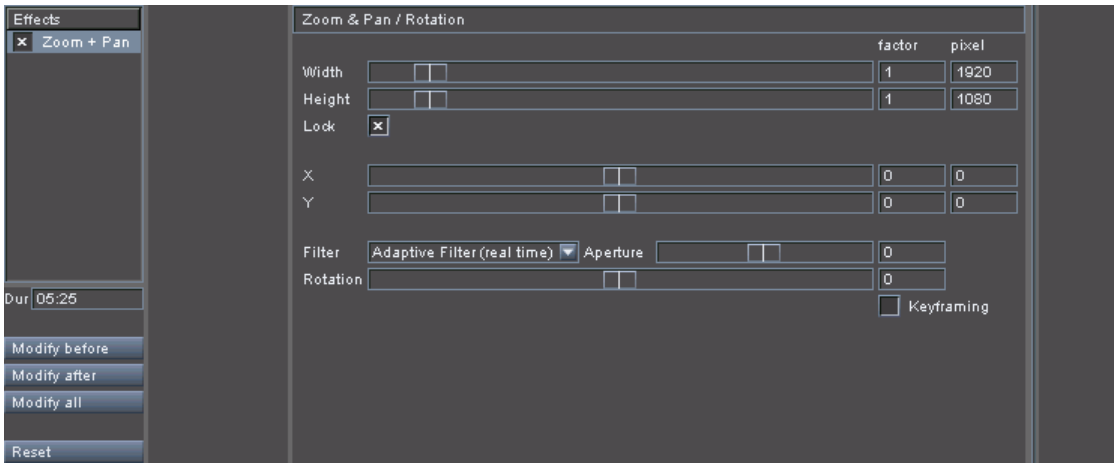


Figure 7-10: Zoom and pan operator

This section describes in detail the settings that this operator provides.

7.7.1 Items for Zooming

With the sliders for width and height you can adjust the zooming. Simply pull the sliders to the left to zoom out of the clip or to the right to zoom in.

Figure 7-11: The items for zooming

Additionally, you can enter either the zoom factor or the pixel size that the original frames should be set to in the respective entry fields to the right of the sliders manually.

Slider	Slider Movement	Result	Factor Range
Width / **Height**	left	zoom out	< 1
	right	zoom in	> 1

With the check box **Lock** activated, the original aspect ratio (the relation of width (x) and height (y) of the video format) can be preserved. If enabled, the images will neither get stretched nor compressed and the remaining value will adjust itself automatically.

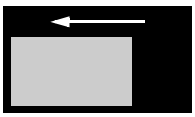
The way a zooming of the video clip is performed can be influenced with the combo box **Filter**. Its settings are explained in section "Advanced Settings" on page 7-18.

7.7.2 Items for Panning

To achieve a panning for the currently selected clip two sliders are at your disposal.

Figure 7-12: The items for panning

With them you can move, for instance, in a zoomed clip to the part of the clip (image) that should be displayed during a play-out. For example, if you move the **X** slider to the left, the image will move to the left; and if you move the **Y** slider to the left, it moves up:

Slider	Slider Movement	Image Movement	Factor and Pixel Range
X	left		negative
	right		positive

Slider	Slider Movement	Image Movement	Factor and Pixel Range
Y	left		negative
	right		positive

As already indicated in the table above to the right of the sliders you can find entry fields where you can specify either the image movement factor or the movement in pixels manually. Simply enter the respective value with the appropriate sign as specified in the table to pan the image. The factor and pixel range entries have to be set in dependence on the settings made for zooming.

7.7.3 Advanced Settings

Below the items for panning you can find a combo box to determine the filter used for zooming as well as two sliders to set the rotation and sharpness.

Figure 7-13: The advanced settings items

The combo box **Filter** is associated with the sliders for sharpness (setting **Aperture**) and zooming. It determines the algorithm that will be used to change the video image content. The following settings are available on the list of the combo box:

Filter	Meaning
`Classic (real time)`	This filter uses an algorithm without filtering and is ideal when working with light scaling factors only, because it results in very sharp pictures. If this filter is selected, all alterations will be performed in real time, but sharpness cannot be controlled manually.
`Bilinear (real time)`	Applies a bilinear filtering to the zoomed image and may be appropriate for greater scaling factors. It is real-time capable, but sharpness cannot be controlled manually.

Filter	Meaning
Adaptive Filter (real time)	Default setting for the 'Zoom + Pan' operator. It provides an optimized filtering for every scaling factor which will result in high-end quality pictures. This filter is real-time capable.
Adaptive+ Filter (real time)	Doubles the precision and quality of the 'Adaptive Filter' by using hardware resources that are normally used to calculate transitions in real time. When this filter is selected for zoomed clips, transitions between these clips may require a prerendering (see section "Prerendering of Timeline Elements" on page 6-41). This can be avoided by either removing a scaling or setting the clips to the default 'Adaptive Filter'.
AdaptiveExtra Filter (real time)	Same as the 'Adaptive+ Filter' with the sharpness and details of the pictures further enhanced.
Downconvert (real time)	Special filter available for a conversion of clips in larger resolutions to lower ones, reducing interlace flickering as well. Optimized for a conversion of HD material to SD.
Downconvert+ (real time)	Same as the 'Downconvert' filter with the sharpness and details of the pictures further enhanced.
Software Filter (rendering)	With this setting the best possible filter is selected. It provides a software based sophisticated algorithm for all settings on the operator 'Zoom + Pan'. However, if this filter is used, the clip has to be prerendered prior to a play-out (see section "Prerendering of Timeline Elements" on page 6-41).

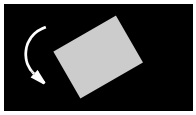
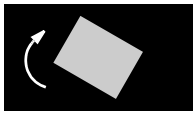
With the **Aperture** items to the right of the **Filter** combo box you can sharpen or blur the image. The slider and its entry field to the right find their main usage when Moiré effects occur in your images. Moiré effects are interferences in your video output signal usually caused by fine black and white image details in your video clip such as striped or checked patterns. If such interferences in your output occur, use the

slider and pull it to the left or right until the jittering or other interferences disappear.

Slider	Slider Position	Result	Factor or Factor Range
Aperture	left	blur	< 1
	right	sharpen	> 1

The **Aperture** slider is not available for certain filters selected via the combo box **Filter**.

With the **Rotation** slider and its entry field at the bottom of the settings pane you can rotate the clip full circle (±180°). By dragging the slider to the left or entering a negative value in the entry field you can rotate the image counter-clockwise and by dragging the slider to the right or entering positive values you can rotate the image clockwise.

Slider	Slider Movement	Rotation	Entry Field Values
Rotation	left		negative
	right		positive

If a clip is rotated, the clip has to be prerendered prior to a playout (see section “Prerendering of Timeline Elements” on page 6-41).

The check box **Keyframing** activates keyframing for this effect. Further information about this can be found in section “Keyframing” on page 7-21.

7.8 Keyframing

For effects there may be keyframing available. It allows you to use the effect on a clip's timeline with definable points of settings (keyframes). With this you can easily configure, for instance, smooth transitions between these effect's settings, for example, to fade in the effect during a play-out of the clip.

This feature is available for zooming and panning (see section "The Operator 'Zoom + Pan'" on page 7-16).

For a description how to activate it, please refer to the section of the above mentioned effect.

Once activated for the respective effect, the keyframe editor will be displayed in the settings pane of the effect:

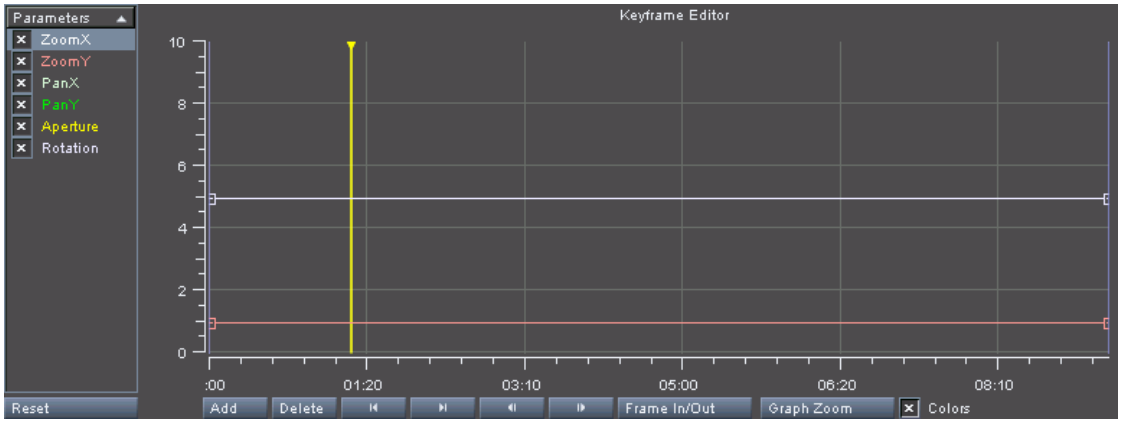


Figure 7-14: Keyframe editor

With the keyframe editor a keyframing of the effect's settings can be set. On the left hand side you can find a list of the effect's settings that can be used for a keyframing. On the right hand side the graph of the keyframe editor is displayed where a keyframing can be configured.

7.8.1 The Parameters List

To the left of the keyframe editor you can find the **Parameters** list. It lists all settings of the effect that can be used for a keyframing:

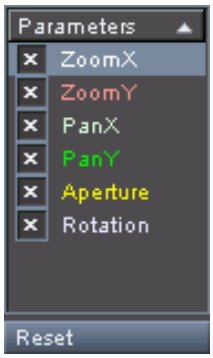


Figure 7-15: Parameters list

For each effect setting in the list there is one keyframing line available in the graph of the keyframe editor. In the default view of the keyframe editor they are color coded, meaning each setting is displayed in a different color and you can easily identify the keyframing line belonging to a setting because they are drawn in the same color.

However, due to the fact that most effect settings have default values of either one (e.g. 1.000) or 50%, their respective keyframing lines may overlap each other in the graph. With the list of parameters you can select the setting that should be keyframed: When selecting a setting from the list, you can click on the stack of keyframing lines in the graph and create a keyframe for this particular setting (even if others are visible on top of it). However, this works only as long as there is no other keyframe available at this location. In case you accidentally selected another stack of lines, the keyframe will be created instead on the keyframing line first available from the top of the parameters list.

You can see the selected keyframing line and whether others are on top of it more clearly with the check box **Colors** deactivated. Then the keyframing lines are displayed without color coding, except for the currently selected line which will be highlighted in blue (as long as no other lines are on top of it).

The check boxes in front of the settings in the parameters list allow you to display or hide keyframing lines in the graph. If the check box in front of a setting is activated, its keyframing line is displayed; if deactivated, it is hidden. With this you can display only those keyframing lines in the graph where a keyframing should be performed.

Additionally, the settings entries of the **Parameters** list provide the following context menu:

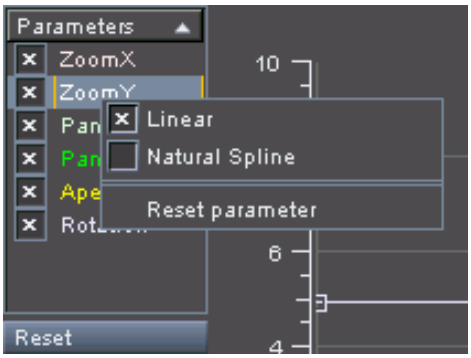


Figure 7-16: Context menu of parameters list

Linear
Natural Spline

These settings determine the curving of the keyframing line of the selected setting. You can toggle between them. With ***Natural Spline*** activated the keyframing line will be curved between the keyframes, with ***Linear*** it will be straight from keyframe to keyframe. To activate ***Natural Spline*** at least one additional keyframe has to be set on the keyframing line of the selected setting.

Reset parameter

This menu option resets the selected setting of the parameters list. It removes all additional keyframes from the keyframing line, restores its default values and sets it back to ***Linear***.

The button **RESET** sets all settings of the parameters list back to their default values and states, i.e. all additional keyframes will be removed from their keyframing lines, their default values will be restored and their curving will be linear again.

7.8.2 Viewing the Graph

Because an effect is valid for a single clip in the timeline, the graph of the keyframe editor usually shows the timeline of the selected clip. Nevertheless, it can be set to a viewing/zooming of your needs.

When trimming a clip in the timeline while the keyframing editor is visible, the trimming will be displayed in the graph: The trimmed parts will be shown dimmed with a blue hue.

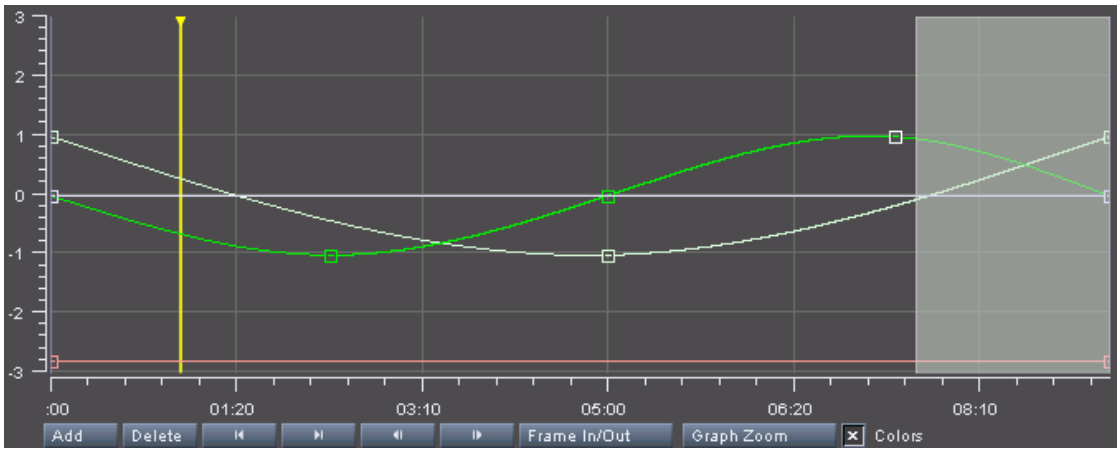


Figure 7-17: The graph

To work on a selected part of a clip you can use the button **FRAME IN/OUT**: Set the timeline's in- and outpoint to the part you want to zoom into and press this button. The graph will then display the selected part only.

The graph will show the timeline's in- and outpoint same as the timeline: Any deselected part will be displayed in a dimmed fashion.

A zooming can also be performed with the button **GRAPH ZOOM**: Pressing this button while moving with the mouse to the right or left allows you to zoom in and out of the graph. Alternatively, instead of the button you can also use the keyboard combination [Shift + Ctrl] (then move the mouse). The zooming will be made on the current viewing position.

In case you want to view a particular detail, you can hold down the [Ctrl] key and draw a (yellow) rectangle with the mouse around it in the graph. Once the mouse button is released, the view of the graph will be adjusted to the width of the drawn rectangle.

When zoomed into the graph, a scroll bar will be available at the top of the graph which allows you to change the viewing position on the graph's timeline. You can also hold down the keyboard keys [Shift + Alt] and move the mouse to the right or left to change the viewing position.

As long as the graph has the focus, you can reverse a zooming and step between previous views on the clip's timeline with the keyboard keys [Page Up] and [Page Down].

The viewing/zooming can also be set back to the full view of the clip's timeline again. For this you have to use the context menu of the graph:

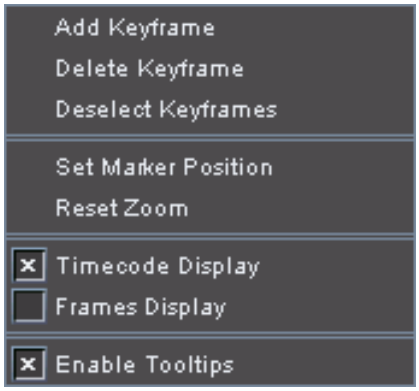


Figure 7-18: Context menu of the graph

On the graph's context menu select the menu option ***Reset Zoom*** to reset the view of the timeline.

Furthermore, the context menu provides the possibility to switch the notation of the graph's scale. For this select from the context menu either the ***Timecode Display*** or ***Frames Display*** menu option. This will change the notation of the graph as well as of all position and length indicators in the software module.

7.8.3 Moving within the Graph

The graph provides a cursor same as the timeline cursor of the Edit Tool. They are connected to each other, meaning when one of them is moved, the other one will move accordingly. This way you can move in the graph directly and see the effect of a keyframing in the overlay immediately:

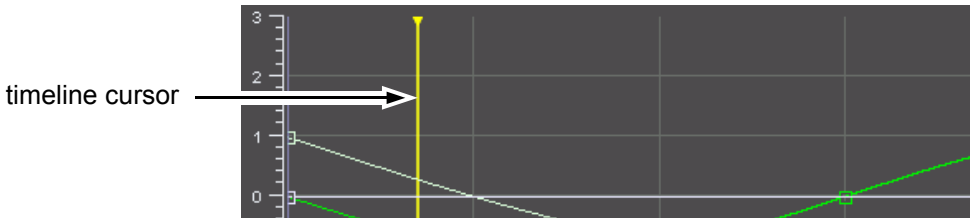


Figure 7-19: The timeline cursor in the graph

To position keyframes or review their effect you may want to move the timeline cursor in the graph. There are several ways to do this:

– You can click anywhere with the mouse in the graph and the timeline cursor will be positioned there immediately.
– The timeline cursor of the graph can be scrubbed the same way as you can scrub a scrub bar/timeline of the DVS software.

– You can use the controls of the Edit Tool as usual to move in or play out the timeline (see section "Moving within the Timeline" on page 6-25). The cursor of the graph will be moved accordingly.
– You can set an in- and outpoint for the timeline (see section "Setting an In- and Outpoint for the Timeline" on page 6-28), for example, to confine a play-out to the clip currently under processing or to zoom further into the graph (see section "Viewing the Graph" on page 7-23).

When moving the graph's timeline cursor with the mouse, its exact position is displayed to the left of the cursor:

Figure 7-20: Exact positioning 1

Additionally, you can move the timeline cursor with the menu option ***Set Marker Position*** of the graph's context menu (see figure 7-18 on page 7-25). It will open a small window in the graph where the position of the timeline cursor can be entered:

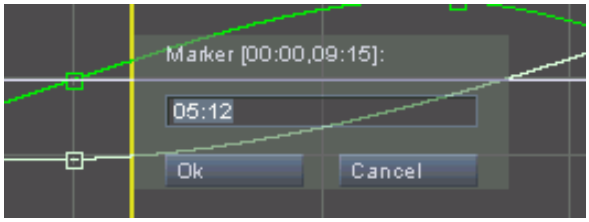


Figure 7-21: Exact positioning 2

The range of possible values that can be entered is indicated in the window in square brackets. Once a correct position is entered, the marker can be positioned there exactly either by using the **OK** button of the window or by pressing [Enter].

Furthermore, there are some buttons available at the bottom of the keyframe editor that allow you to move the graph's cursor:

You can jump to particular points in the graph with these buttons (e.g. to keyframes and the beginning/end of a clip). The first button jumps to a previously located point in the graph while the second button jumps to the next one.

With these buttons you can step one frame/field for- or backward in the clip currently under processing. The cursor will move accordingly. Alternatively, you may use the keyboard shortcuts [Left Arrow]/[Right Arrow] or [3]/[4] when the timeline has the focus.

7.8.4 Setting Keyframes

Keyframes for an effect setting can be set easily in the keyframe editor: A single click on the respective keyframing line of the setting in the graph will create a keyframe.

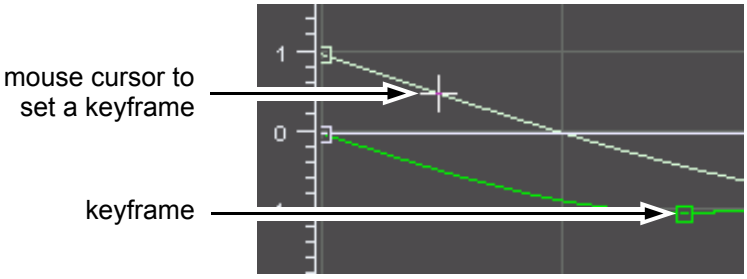


Figure 7-22: Creating keyframes

Usually the keyframe will be created on the keyframing line of the setting that is either selected or available first in the parameters list (see section “The Parameters List” on page 7-21).

To create keyframes you can also use the button **ADD** below the graph. It will create keyframes on all visible keyframing lines at the current location of the timeline cursor.

Additionally, with the menu option ***Add Keyframe*** of the graph’s context menu (see figure 7-18 on page 7-25) you can create a keyframe for the setting that is currently selected in the parameters list. The keyframe will be created at the position of the timeline cursor.

7.8.5 Positioning Keyframes

Once a keyframe is created, it can be moved and positioned freely with the mouse:

Figure 7-23: Positioning keyframes

During the moving of a keyframe with the mouse, its position and setting is displayed on the screen, allowing you to accurately position and set the keyframe.

Each keyframing line represents a setting of the effect. Thus, to set and adjust a keyframe you can also use the settings of the effect directly. Simply select one of the settings items in the settings pane of the effect and a keyframe will be created on the respective keyframing line at the position of the timeline cursor. Then it can be adjusted to your needs with the settings item of the effect directly.

The settings items of the effect can also be used to adjust already available keyframes. For this position the timeline cursor of the graph on a keyframe (see section "Moving within the Graph" on page 7-25) and then use the settings item in the settings pane of the effect to change the keyframe.

An already created keyframe can also be adjusted precisely in the graph with a double-click of the mouse on a keyframe. This will open a small window in the graph where the setting of the keyframe can be entered:

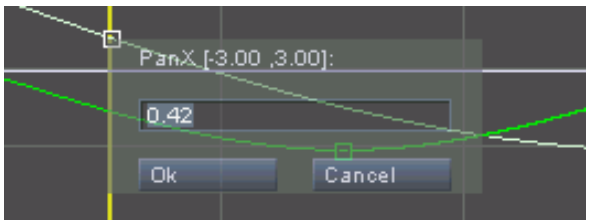


Figure 7-24: Exact positioning of keyframe

The range of possible values that can be entered is indicated in the window in square brackets. Once a valid setting is entered, the keyframe can be precisely set either by using the **OK** button of the window or by pressing [Enter].

7.8.6 Further Possibilities

When working with keyframes there are further possibilities at hand, for example, to select and position keyframes or to delete them:

Just as easily as single keyframes can be selected with the mouse, several keyframes can be selected. For this hold down the [Shift] key and draw a rectangle around them:

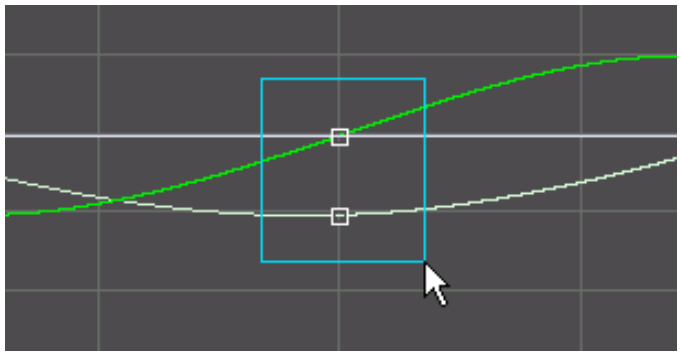


Figure 7-25: Selecting several keyframes

Once the mouse button is released, the keyframes within the rectangle will be selected. Then they can, for example, be positioned all at once by moving one of them with the mouse. The selected keyframes can be deselected with the menu option ***Deselect Keyframes*** of the graph's context menu (see figure 7-18 on page 7-25).

Of course, created keyframes can also be deleted. For this you have various possibilities at hand: You can select one or more keyframes in the graph and press [Del] on your keyboard or the button **DELETE** below the graph, or you can use the menu option ***Delete Keyframe*** of the context menu of the graph (see figure 7-18 on page 7-25).

Keyframes can also be deleted by resetting the keyframing line(s) (see section "The Parameters List" on page 7-21).

With the menu option ***Enable Tooltips*** of the context menu of the graph (see figure 7-18 on page 7-25) you can turn on or off tooltips for the keyframing editor, independent from the rest of the tooltips displayed in the Edit Tool.

7.9 The Operator '1D-LUT'

With the operator '1D-LUT' you can assign a static look-up table (LUT) to the currently selected clip to perform a color and/or gamma correction.

With this operator only one-dimensional look-up tables (1D LUT) can be applied. 3D LUTs can be loaded and applied to the timeline via the video format settings (optional feature, see section "Loading and Applying a 3D LUT File" on page 6-17).

Figure 7-26: The area for to set a static LUT

In the area **Static LUT** you can find at its top a list box that will contain the LUT files in the order they were selected. If the list box contains more than one LUT, the effects of the LUT files are combined to color correct the images of the clip.

Below the list box three buttons are available. With the button **+** you can load a LUT. For this select in the opening dialog window the directory path and file name of the look-up table. After this confirm your selection with the button **OPEN**. This will load the selected LUT file and its name and path will be entered in the list box above.

File extension:	`*.lut`	Look-up table
	`*.txt`	

The selected file will then be valid for the currently selected clip and a color and/or gamma correction will be performed accordingly. By repeating this action you can select and load more than one LUT file and their effects will be combined.

Several sample LUT files are delivered with the DVS software. They can be found in the directory `lut` of the software's installation path (default: `C:\Program Files (x86)\DVS\Clipster`).

With the button **-** you can delete an already applied LUT from the list box. Simply select an LUT file entry from the list box and press this button to delete it.

If more than one LUT file is loaded, the button **SAVE** will combine their color correction settings and create a new LUT file from the already set ones. Afterwards you can use this single LUT file instead of several ones to color correct video clips..

More detailed information about 1D LUT files can be found in section “1D LUT Files” on page A-14.

The Menus

At the top of the Edit Tool software module you can see a menu bar.

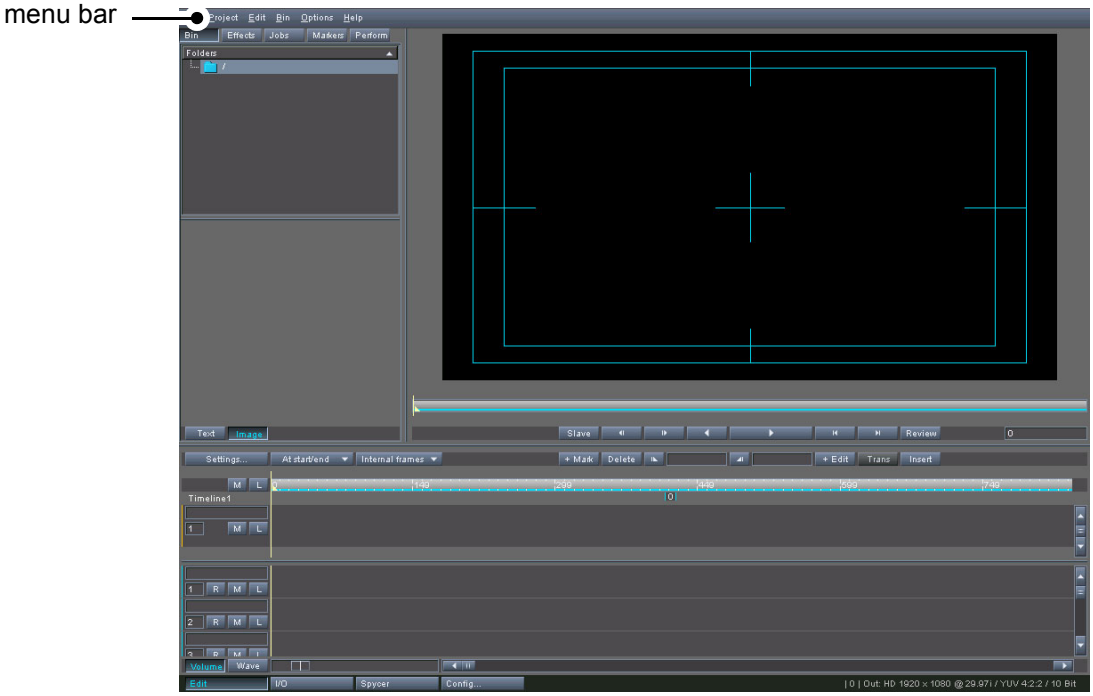


Figure 8-1: Menu bar of DVS software

This menu bar provides access to functions and tasks of an administrative nature for the Edit Tool. Here you can find, for example, import and export functions as well as several menu options generally concerned with projects and project files.

This chapter describes the menu bar of the user interface. All menus and menu options will be explained.

8.1 The Menu of the Program Icon

The program icon on the menu bar of the user interface provides menu options to control the user interface of the DVS software in general. Here you can find the following menu options:

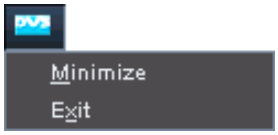


Figure 8-2: The menu of the program icon

They are described in the following sections.

8.1.1 Minimize

To reduce the DVS software to a button on the taskbar of the Windows operating system, click the ***Minimize*** menu option on the menu of the program icon. You can then, for instance, access other programs that are installed on your system.

8.1.2 Exit

The menu option ***Exit*** ends the current Edit Tool session.

There is no way to end the Edit Tool alone. When you exit the Edit Tool, the whole DVS software will shut down. Therefore, it is recommended to finish all tasks, such as a a play-out operation, beforehand. Otherwise the respective task may get interrupted.

This closes the DVS software. After that you can, for example, shut down the system.

8.2 The 'Project' Menu

The menu ***Project*** contains the following menu options:

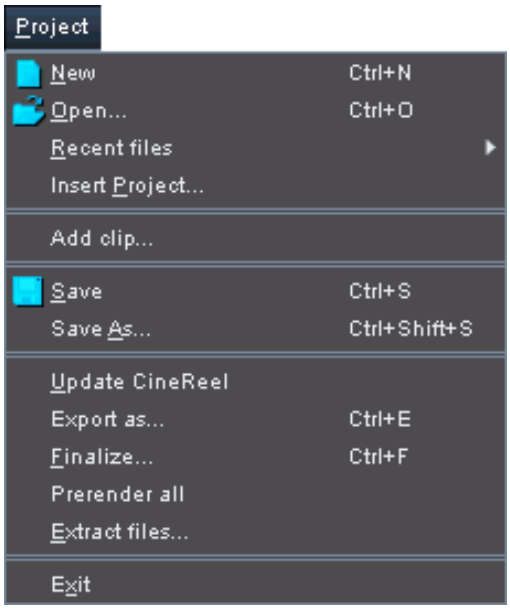


Figure 8-3: The 'Project' menu

They are in detail described in the following sections.

8.2.1 New

The menu option ***New*** on the ***Project*** menu opens a new project file in the Edit Tool.

Once the new project file is loaded, you can begin your new project, for instance, by adding clips to the bin.

In the Edit Tool only one project file can be processed at a time. If you open an already saved project or activate the menu option ***New*** again, the currently active project file will be closed. However, if you have already performed changes to the project, you will be asked by the program if you want to save the current project.

When you start a new project file, the autosave function is disabled because of a missing file name for the project. The autosave function automatically saves your project file after a certain period of time for backup purposes (see "Fuze Configurations" user guide for more details). To enable the autosave function you have to save the project file first and thus assign a name to it.

The VTR task mode of the I/O Tool uses project files different from the ones usually saved via the DVS software. Further information about this can be found in the "Fuze I/O Tool" user guide.

8.2.2 Open...

The ***Open...*** menu option opens the standard dialog window of the operating system for the selection of a file. In this dialog window select the project file that you want to open in the Edit Tool.

File extensions:	`*.cp`	Project file
	`*.cp.autosave`	Automatically saved intermediate situation
	`*.backup.cp`	Backup file of old project file

During loading, the bin and thus the timeline will be checked for inconsistencies, i.e. it is tested whether the first and the last frame of each clip present in the bin is actually available on the storage.

Missing frames will be substituted during a play-out with the Edit Tool by a standard image (see section "Consistencies of Clips" on page 6-57). Then it is recommended to perform a more accurate testing of the bin with the menu option ***Check Bin*** on the ***Bin*** menu (see section "Check Bin" on page 8-15).

If the first and/or last frame of a clip is missing, you will be informed about this the same way as described in section "Check Bin" on page 8-15.

Additionally, with the project file the bin, the timeline, the viewing settings, the output settings, etc. will be set anew and the layout will be updated.

In the Edit Tool only one project file can be processed at a time. If you open another project or activate the menu option ***New***, the currently active project file will be closed. However, if you have already performed changes to the project, you will be asked by the program if you want to save the current project.

The VTR task mode of the I/O Tool uses project files different from the ones usually saved via the DVS software. Further information about this can be found in the "Fuze I/O Tool" user guide.

8.2.3 Recent files

The ***Recent files*** option on the ***Project*** menu opens a submenu where you can find project files that were recently opened in the DVS soft-

ware. From the submenu select a file to work with the respective project again.

You can adjust the number of files that will be listed on this submenu via the Configuration Tool (see "Fuze Configurations" user guide for more details).

8.2.4 Insert Project...

The menu option ***Insert Project...*** enables you to import already finished and saved projects into the currently loaded project. The bin as well as clips present in the timeline, including all transitions and effects settings, will be imported. With this feature you can, for example, assemble a master project from smaller projects which contain individual scenes.

In general the menu option ***Insert Project...*** works like the menu option ***Open...*** (section "Open…" on page 8-4), but instead of opening a project, it will be inserted into the currently active project at the position of the timeline cursor. The clips in the bin of the inserted project will be added to the bin of the current project in a further subfolder carrying the name `inserted project`.

You can adjust the inserting of projects to your liking with the Configuration Tool (see "Fuze Configurations" user guide for more details). There you can, for instance, adjust the name of the bin subfolder where the bin clips will be added.

8.2.5 Add clip...

The menu option ***Add clip...*** performs the same operation as the ***Add clip...*** menu option on the context menu of the bin's contents area. See section "Adding Clips to the Bin Using the 'Add Clip' Menu Options" on page 4-8 for further information about this.

8.2.6 Save

With the menu option ***Save*** you can save the current project. If the edited project file was a new one, a dialog window opens where you have to specify the storage path and file name for the project. Project files are by default stored with the file extensions `*.cp` (or `*.cp.autosave` if it is saved via the autosave function, see "Fuze Configurations" user guide for more details). Furthermore, during the saving procedure

the old project file is saved as an additional backup file with the file extension *.backup.cp.

File extensions:	*.cp	Project file
	*.cp.autosave	Automatically saved intermediate situation
	*.backup.cp	Backup file of old project file

If a file name is already assigned to the currently opened project, this menu option will immediately save the project under the assigned name.

In the project file the bin and the clips of the timeline including all operators will be saved. Additionally, a lot of settings will be saved within the project file as well, for example, the viewing settings of the software modules, the timeline and the control area, the output settings as well as the project related configuration settings made in the Configuration Tool of the DVS software.

The VTR task mode of the I/O Tool uses project files different from the ones usually saved via the DVS software. Further information about this can be found in the "Fuze I/O Tool" user guide.

8.2.7 Save As...

The standard dialog window to save a file will open after the selection of the menu option ***Save As...***. This menu option allows you to save a project file under a different name (see also section "Save" on page 8-5).

The VTR task mode of the I/O Tool uses project files different from the ones usually saved via the DVS software. Further information about this can be found in the "Fuze I/O Tool" user guide.

8.2.8 Update CineReel

The DVS CineReel is a transportable, outdoor-proof hard disk array especially designed for the on-set use of digital film capturing: The film material is directly stored on the hard disk array, and when finished, the array can be disconnected and transported to an editing site while the crew continues to capture on the set with an empty DVS CineReel. At the editing site the hard disk array can be connected to a DVS system easily and the material will be instantly recognized. Then it can be processed right away.

The menu option ***Update CineReel*** on the ***Project*** menu checks whether a DVS CineReel is connected to the DVS system. Then, in the

bin a folder with the name `CineReel` is created and the film material on the hard disk array is referenced to this folder. In the newly created folder, the directory structure on the DVS CineReel is imitated and for each clip present on the hard disk array a bin clip will be available. You can then work with the data immediately.

With the menu option ***Update CineReel*** no copying process of any kind is initiated. Only representations of the clips are created.

The DVS CineReel as a storage for video material will be too slow for real-time processes It is recommended to copy the material to the main storage of the DVS system beforehand.

Before connecting another DVS CineReel save the project and start a new one. Otherwise the references to the first DVS CineReel will be void.

8.2.9 Export as...

With the menu option ***Export as...*** of the Edit Tool you are able to create data lists in the EDL format (CMX or GVG) from the timeline of the Edit Tool.

The selection of this menu option opens the following window where you have to specify the creation of the data list further:

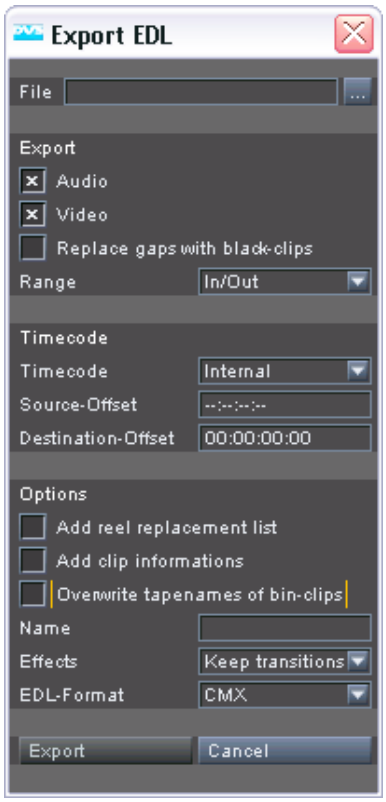


Figure 8-4: Window to specify the creation of an EDL

In the window to export an EDL enter the necessary details as indicated in the following.

EDL File Name

In the entry field **File** you have to state the storage path and file name of the data list to be created. You may also click on the button to the right of this field (...) to select an already existing file.

Notation: `drive_letter:\directory\subdirecto-ry\filename`

Instead of the backslash (\) you may also use a slash (/).

The file name can be a standard file name of the Windows operating system, i.e. do not use one of the following characters:
`% / \ : * ? " < > |`

Example: `V:\tempest\edl\tempest_edl`

Setting up the Timeline for the EDL

Use the area **Export** to set up the timeline of the Edit Tool, i.e. the tracks as well as the timeline's range, for the creation of the EDL. It provides the settings items as described below:

Audio	This check box determines that audio should be part of the data list, i.e. the contents of the audio tracks of the Edit Tool will be added to the created file.
Video	This check box determines that video should be part of the data list, i.e. the contents of a video track of the Edit Tool will be added to the created file. Only one video track and, if not muted, the first video track will be exported.
Replace gaps with black-clips	If this check box is enabled, gaps present in the timeline will be handled as black clips in the EDL.
Range	With this combo box you have to set whether the data list should include the complete timeline (`All`), or the part between a set in- and outpoint of the timeline only (`In/Out`).

By muting tracks you can determine the contents of the timeline that should be used during the creation of the data list further (see section "Muting and Locking Tracks" on page 6-32).

Configuration of the EDL Timecode

Because a data list contains for the most part detailed timecode information, the area **Timecode** of the window to export an EDL provides you with items to specify the timecodes as they will occur in the EDL. For this use the settings items as described below:

Timecode	This combo box determines the type of timecode that should be used for the creation of the data list. You can set that the file numbers of the file names on the storage should be translated to timecode and set as the source in- and outpoints of the data list (`Internal`), or that the source timecodes provided by the headers of the files should be used (`Source TC`). In case the clips in the timeline are configured to show a virtual source timecode, this timecode will be taken when `Source TC` is selected.
Source-Offset	With this entry field you can define an offset for the clips' in- and outpoints (the in-and outpoints within their respective source material), i.e. you can adjust and relocate their trim points. Enter the respective offset in timecode format.
Destination-Offset	With this entry field you can set an offset for the clips' destinations within the created timeline of the data list. If the timeline of the Edit Tool is set to a timeline offset already, it will be detailed in this field. Enter the respective offset in timecode format.

Detailing Additional Options

The area **Options** provides additional items to determine the creation of the data list. Use them as indicated below whenever the list to be created should provide these features:

Add reel replacement list	This check box adds a list (as comments) below the generated EDL that maps the abbreviated reel/tape names used in the EDL to their original names. If no reel names are available, the list will detail the path and file to the source material on the storage.
Add clip information	Adds further information (as comments) about the clips to the EDL. Each clip will then detail its name as it can be seen in the timeline (`* FROM CLIP NAME`) and the path and file to its source material on the storage (`* FROM FILE`).

Overwrite tape-names of bin-clips	Usually when generating a data list, abbreviated names of the clips as they can be seen in the timeline will be used as the reel/tape name (see, for instance, section "The Clip's Information" on page 6-54). By selecting this check box you can enter a different reel name in the entry field **Name**.
Name	Once the check box to overwrite the tape names is enabled, this entry field will be available. With it you can specify a different reel name for the clips in the data list. It will be used for all clips present in the timeline. You have to enter the reel name in the correct notation of the EDL format that is selected with the combo box **EDL-Format**.
Effects	With this combo box you determine whether transitions in the timeline should be retained in the data list or replaced by hard cuts instead.
EDL-Format	Select from this combo box the EDL format that the created EDL should provide.

Creating the EDL

Once the settings to export a data list are complete, you can start its creation with the buttons below the area **Options**:

EXPORT	Use this button to start the creation of the data list. When successful, this window will be closed.
CANCEL	This button closes the window without creating a data list.

Time stretching or time compression information will not be observed during the creation of the data list (see section "Time Stretching or Time Compression of Clips" on page 6-51).

8.2.10 Finalize...

With the menu option ***Finalize...*** you can generate a new clip from a project's timeline in a freely configurable format and raster without affecting the original material. This is in detail described in section "Finalizing the Timeline" on page 6-68.

8.2.11 Prerender all

With the ***Prerender all*** menu option you can prerender all parts of the timeline that need to be processed before a play-out together in one step. A prerendering may be indicated prior to a play-out when the DVS system is not able to handle the contents of the timeline in real time, for instance, a special operator. Further information about this can be found in section "Prerendering of Timeline Elements" on page 6-41).

Depending on the number of elements to be prerendered, the length of the elements and the configured output settings, the prerendering may take some time.

Further information about how to manage projects best when parts of the timeline need to be prerendered can be found in section "Notes on Project Management" on page 2-11.

After a prerendering save your project file. If an already saved project file is not saved after a prerendering process again, the prerendered files will not be recognized by the Edit Tool when the project file is loaded once more, i.e. they will not be used for a play-out. They remain on your storage and have to be deleted manually as described in section "Cleaning Temporary Data Manually" on page A-22.

8.2.12 Extract files...

The ***Extract files...*** menu option copies all files on the timeline to a specified directory or volume, thus allowing you to archive an edited project. The directory structure of the files on the storage will be copied as well. Once this menu option is selected, the following window will be displayed on the screen:

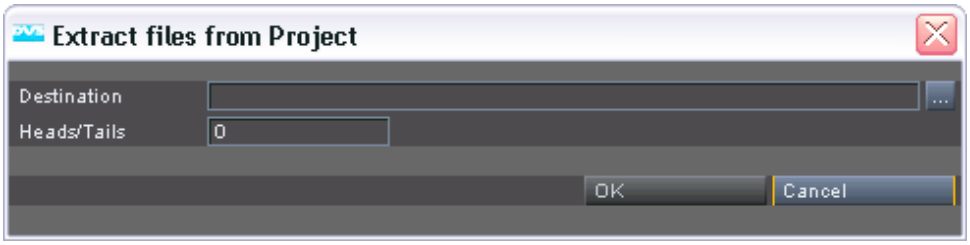


Figure 8-5: Archiving a project

In this window enter the target directory/volume of the files to be copied in the field **Destination**. You may also use the button to the right of this entry field (...) to select an already existing directory/volume or create a new one via the provided buttons of the opening dialog window. If the entered path does not exist, it will be created.

The content (frames) to be copied is determined by the in- and out-points of the clips on the timeline. With the **Heads/Tails** entry field you can set the number of frames that should be copied in addition to these for later heads or tails adjustments.

When everything is set, you can initiate the copying process with a click on the button **OK**. Then the DVS high-speed copying process will copy the files to the selected destination.

To archive the whole project you have to save the project file as well.

Audio clips and clips in container file formats are copied as a whole.

Further information about the DVS high-speed copying process can be found in the “Spycer” user guide.

8.2.13 Exit

The menu option ***Exit*** ends the current Edit Tool session.

There is no way to end the Edit Tool alone. When you exit the Edit Tool, the whole DVS software will shut down. Therefore, it is recommended to finish all tasks, such as a a play-out operation, beforehand. Otherwise the respective task may get interrupted.

This closes the DVS software. After that you can, for example, shut down the system.

8.3 The 'Edit' Menu

The menu ***Edit*** provides functions to aid you in your editing process. In detail it contains the menu options shown below:

Figure 8-6: The 'Edit' menu

They are described in the following sections.

8.3.1 Undo

The menu option ***Undo*** allows to undo your latest timeline related action. When this option is selected, the timeline will be restored to the state before your last timeline operation.

8.3.2 Redo

The ***Redo*** menu option will reverse the action performed via the ***Undo*** menu option (see section “Undo” on page 8-13). To redo an action select this menu option.

8.4 The 'Bin' Menu

The menu ***Bin*** provides several functions to facilitate your work with the bin. In detail it contains the menu options shown below:

Figure 8-7: The 'Bin' menu

They will be described in detail in the following sections.

8.4.1 Import Bin...

With the menu option ***Import Bin...*** you can import the bin of another project into your currently active project. The selection of this menu option opens a standard dialog window for a file selection.

To import a bin you can select a either a normal project file of the DVS software or a bin file which can be created via the menu option ***Export Bin...*** (see section "Export Bin..." on page 8-15).

File extensions:	`*.cp`	Project file
	`*.cb`	Bin file
	`*.cp.autosave`	Automatically saved intermediate situation
	`*.backup.cp`	Backup file of old project file

When loaded, the selected bin with folders and clips will be imported into your currently active project. The imported bin will be checked for inconsistencies, i.e. it is tested whether the first and the last frame of each clip is actually present on the storage.

With the help of the menu option ***Check Bin*** of the ***Bin*** menu you can perform a more accurate testing of your bin (see section "Check Bin" on page 8-15).

If the first and/or last frame of a clip is missing, you will be informed about this the same way as described in section "Check Bin" on page 8-15.

8.4.2 Export Bin...

You can export the bin of your currently active project with the menu option ***Export Bin...***. It will save the contents of your bin including all folders and clips to an extra file.

The selection of this menu option opens a standard dialog window to save a file, where you have to specify the storage path and file name to export the bin.

File extension: `*.cb` Bin file

Once the contents of the bin is saved, you can import it into another project whenever you want (see section "Import Bin…" on page 8-14).

8.4.3 Clear Bin

The ***Clear Bin*** menu option on the menu ***Bin*** deletes all folders and clips from the bin of your current project.

The selection of this menu option calls up a warning message. After the confirmation that you really want to delete the contents of the bin, the bin will be cleared.

If your currently active bin was altered and not saved, you will be asked by the program whether you want to save its contents to a bin file. When you answer this query with **YES**, the same procedure as to export a bin will be initiated (see section "Export Bin…" on page 8-15).

8.4.4 Check Bin

During the loading of a project file and the import of a bin, the DVS software performs a limited test regarding the availability of the clips present in the bin: It is tested whether the first and the last frame of each video clip is available on the storage. Via the ***Check Bin*** menu option you can check your bin, and thus your timeline, more thoroughly for errors and inconsistencies.

If the first and/or last frame of a clip is missing, you will be informed about this the same way as described in this section.

After the selection of the menu option ***Check Bin*** the DVS software verifies that each frame of each clip and each audio file is present on the storage. If inconsistencies are found, i.e. missing files, you will get the following error message:

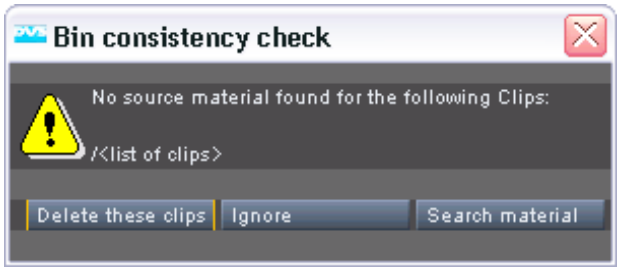


Figure 8-8: Error message of inconsistencies in the bin

The error message provides a detailed list of all clips that could not be verified. With the button **DELETE THESE CLIPS** you can then delete the faulty clips from your bin, or you can proceed to the inconsistent bin with the button **IGNORE**.

Missing frames will be substituted during a play-out with the DVS software by a standard image (see section "Consistencies of Clips" on page 6-57).

If you are opening a project created on another system, you can also search for the missing material by altering the default paths of the DVS software (e.g. the **System base video directory**, see "Fuze Configurations" user guide). A click on the button **SEARCH MATERIAL** opens the following window:

Changing theses paths will alter the DVS software's default settings – not only for this project but for the DVS software in general. If not set back to the original default paths following your work on this project, it will have implications on previously created as well as future projects.

For more details about the individual paths and their meaning see the "Fuze Configurations" user guide.

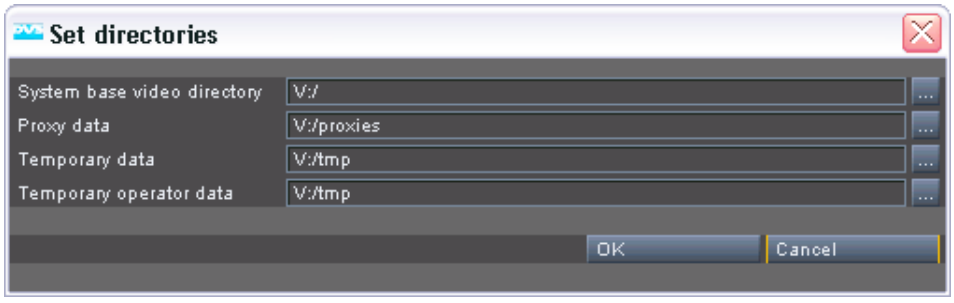


Figure 8-9: Setting system-wide directories

Either type in the appropriate paths or use the buttons to the right (...) to select them. After confirming your alterations with the button **OK** the DVS software will change its default paths and search for the clips at the new locations. If found, they will be immediately available in your project.

8.5 The 'Options' *Menu*

The ***Options*** menu provides menu options to set up and configure the DVS system and its software. In detail it contains the menu options shown below:

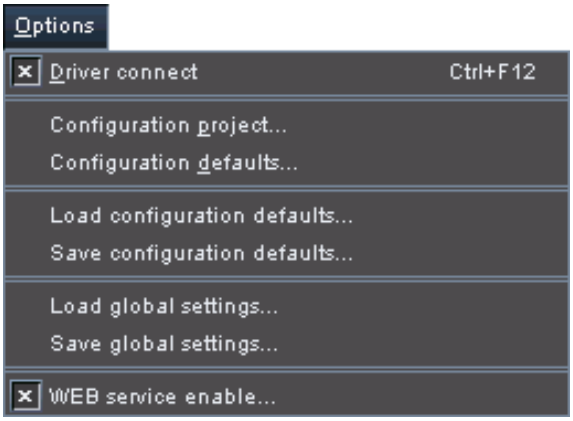


Figure 8-10: The 'Options' menu

They will be described in the following sections.

8.5.1 Driver connect

Because the DVS system is based on an open platform, other programs than the DVS software may want to access the video board of the system. To make this possible even with the DVS software running, the menu option ***Driver connect*** was implemented.

When the driver of the video board is connected to the software, the check box in front of this menu option is activated. If the driver is disconnected and free to be used by other programs, the check box is deactivated.

If the driver is not in use by another program, a simple play-out operation of the timeline in the DVS software will connect the driver to the DVS software again automatically.

8.5.2 Configuration project...

The Configuration Tool provides overall two configuration groupings:

- You can define project related settings in a project grouping (tab **Project**), or
- you can configure default settings that will be used for the DVS system in general as well as for each new project (tab **Defaults**,

see section "Configuration defaults…" on page 8-18).

While the first one includes settings that will be used for the currently active project only and stored together with the project file, the latter contains settings that will be used for each new project as well as for a general setup of the DVS system. Because the default settings include configurations regarding the DVS system as well, it provides comparatively more settings than the project related ones. Use the default settings in case you want to change the system settings or the default values for each initialized new project. The settings of the tab **Project** will be stored together with the current project in the project file only and are therefore just temporarily available as long as this particular project is not closed.

The ***Configuration project…*** menu option enables you to configure and set up the project related settings of the DVS system and software. It will open the Configuration Tool with the tab **Project** activated. Then you can configure, for example, the paths for the temporary data as well as other project specific settings, such as the appearances of clips in the bin. All changes performed on this tab will be saved together with the project file.

For more information and a complete description of the Configuration Tool please consult the "Fuze Configurations" user guide.

8.5.3 Configuration defaults...

The Configuration Tool provides overall two configuration groupings: one for project related settings (tab **Project**) and one for default settings that will be used for the DVS system in general as well as for each new project (tab **Default**).

Further information about the two configuration groupings as well as about the project related settings can be found in section "Configuration project…" on page 8-17.

The ***Configuration defaults…*** menu option enables you to configure and set up the system settings as well as the default values for each initialized new project. It will open the Configuration Tool with the tab **Defaults** activated. Then you can set up, for example, the TCP/IP settings of the DVS software as well as the period for the automatic save function of opened projects (autosave). The default configuration settings are saved automatically together with the software when it is shut down. The project related settings available on the **Defaults** tab will be used for each initialized new project.

For more information and a complete description of the Configuration Tool please consult the "Fuze Configurations" user guide.

8.5.4 Load configuration defaults...

With the menu option ***Load configuration defaults...*** you can load configuration settings previously saved to a file as the new default settings of the Configuration Tool (see section "Save configuration defaults…" on page 8-19). The selection of this menu option opens the standard dialog window for a file selection, where you have to select the desired file that contains the default configuration settings.

File extension: `*.cf` Configuration file

After loading the new settings will be set as the default settings of the Configuration Tool. They will be applied, for example, each time a new project is initialized. Additionally, in the Configuration Tool you have the possibility at hand to transfer the default settings to the project related settings, and thus to enable them for your currently active project.

Some changes to the system settings will be in effect after a restart of the software only.

Further information about the Configuration Tool and its settings can be found in the "Fuze Configurations" user guide.

8.5.5 Save configuration defaults...

Different tasks may ask for different settings: With the menu option ***Save configuration defaults...*** you can save the current default and system settings to an extra file. Thus, you can build up a library of different configuration settings and use them in the future again for different purposes without configuring the whole system anew.

The selection of the menu option ***Save configuration defaults...*** opens the standard dialog window to save a file, where you have to specify the path and file name for the configuration file to be saved.

File extension: `*.cf` Configuration file

Once the current default and system settings are saved, you can load them into the DVS software again whenever you want (see section "Load configuration defaults…" on page 8-19).

Further information about the Configuration Tool and its settings can be found in the "Fuze Configurations" user guide.

8.5.6 Load global settings...

With the menu option ***Load global settings...*** you can load global settings previously saved to a file (see section "Save global settings…" on page 8-20). The selection of this menu option opens the standard

dialog window for a file selection, where you have to select the file that contains the desired settings.

File extension: *.cgs Global settings file

After loading the new settings will be applied immediately and the appearance of the DVS software as well as its current configurations will be changed.

8.5.7 Save global settings...

The project configurations as well as appearances of the DVS software can be saved as snapshot. The global settings will store the statuses of the Edit Tool, I/O Tool and Configuration Tool. With this you can create, for example, a setting for a tape operator, showing the VTR emulation and providing all the important settings for video format, color space, bit depth, and storage paths already predefined.

After configuring everything you would like to have and see, select the menu option ***Save global settings***. It will open the standard dialog window to save a file, where you have to specify the path and file name for the current settings to be saved.

File extension: *.cgs Global settings file

Once the global settings are saved, you can load them into the DVS software again whenever you want (see section "Load global settings…" on page 8-19), which will change, for example, the project configurations and the appearance of the DVS software.

8.5.8 WEB service enable

The menu option ***WEB service enable*** activates or deactivates the web service (SOAP interface) of the DVS software. The SOAP interface allows you to develop an application of your own that can be used to control the DVS software, for example, from a remote computer connected to the DVS system via network. Further information about the web service can be found in a separate document available in the directory *soap\doc* of the software's installation path (default: *C:\Program Files (x86)\DVS\Clipster*).

8.6 The 'Help' Menu

You can get additional information about the DVS software via the menu options of the menu ***Help***. It contains the following menu options:

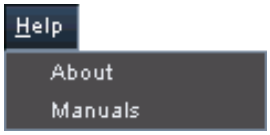


Figure 8-11: The 'Help' menu

They will be described in the following sections.

8.6.1 About

You can receive further information about the DVS software with the menu option ***About*** on the menu ***Help***. For example, here you can find detailed version numbers of the individual software parts of the DVS system.

8.6.2 Manuals

The online documentation of the DVS system can be accessed via the menu option ***Manuals*** on the ***Help*** menu. It opens an overview page in HTML format where you can select a separate documentation for the different parts of the DVS system, all in HTML format.

The manuals for the DVS system are also available in PDF format which is suited most if you want to print out the document. The documentation in PDF format can be accessed easily via the navigation buttons at the bottom of each HTML page.

Appendix

This chapter provides further information about the Edit Tool.

A.1 Glossary of Terms

Here you can find several terms and their meaning as they are used in this documentation:

1D LUT	A look-up table (LUT, see below) that provides for one input value a set of output values (usually RGB).
3D LUT	A look-up table (LUT, see below) that provides for three input values (RGB) a set of output values (RGB).
9-pin protocol (RS-422)	Protocol for serial data communication. The RS-422 9-pin protocol is widely used for a communication between a range of equipment, such as VTRs, digital disk recorders, mixers, edit controllers, etc. See also RS-422 and Odetics protocol. DVS supports this protocol in master and slave mode.
ALE	Avid Log Exchange. A list which describes a timeline with clips. For further details about it and its format see the documentation of Avid Technologies. See also data list.
audio clip	A file of the Windows file system that contains audio data.
bin	Library and clip management tool of the DVS software.
bin clip	A clip present in the bin of the DVS software.
clip	A clip can either be an audio or video clip. See audio clip and video clip respectively.

container format	File format that contains audio as well as video data in a single file only, i.e. the video and audio files are not stored as single image or audio files but together in one file (e.g. QuickTime or MXF).
cutting/edit point	A cut between clips. New cuts can be created with the button **+ EDIT** of the timeline area.
data list	The general term for ALEs, EDLs or cut lists. However, in the software as well as this manual, they may also be referred to as 'EDLs', i.e. implying not the standard but the term 'edit decision list' in general.
drop/dropped frames/audio	Either frames (image files) or audio data that the DVS system could not load from or write to the storage in time for the performed real-time operation.
EDL	Edit decision list. A list that describes a timeline with clips together with a series of operators (effects). EDLs can be created offline and passed to the online workstation to perform the final conforming. See also data list.
effect	See operator.
embedded operator	An operator such as a transition that is embedded in the timeline and visible as a timeline element.
frame-end marker	When zoomed far into the timeline, the timeline cursor will provide a dotted yellow line that indicates where the selected image ends on the timeline.
full	Color value range of video clips indicating a full value range (full). With this black will be represented in 8 bit data by 0 and white by 255. See also head.
head (vs. full)	Color value range of video clips indicating a restricted value range and thus headroom (head). With this black may be represented in 8 bit data by 16 and white by 235. See also full.
head (vs. tail)	Material at the beginning of a clip that is available but neither used nor visible in the timeline of the DVS software due to an inpoint adjustment (trimming). See also tail.

inpoint (clip)	Starting point of a clip. For video material either the first file on the storage or a first frame virtually set (trimmed) in the DVS software. For audio material either the first sample of a file or a virtually set (trimmed) inpoint in the DVS software.
inpoint (timeline)	Starting point of a timeline. It is either a user-defined inpoint or the very beginning of a timeline.
insert mode	Timeline mode during your work with timeline elements. When moving or adding clips in this mode, no gaps will appear in the timeline and the current content of the timeline will be preserved.
keycode	A machine-readable code printed along the edge of the camera negative film. It provides data, for example, about the film type, the name of the manufacturer and the film stock. Additionally, a reference number for the respective image is given in order to match the film with a particular position of a data list. Keycodes can also be stored in file headers if supported by the file format (see also source timecode).
keyframing	The usage of an effect on a timeline with definable points of settings (keyframes), e.g. for to fade in/out this effect.
LUT (look-up table)	In general, a table used to transform data. With the DVS software a LUT is used to map indexed colors of video images to a specified set of output values.
multi-clip	A clip that is handled as one clip although it consists of several individual clips. Multi-clips are directories of the file system that contain subdirectories with frames (image files) and/or audio files. The subdirectories and files must follow specific guidelines to be recognized by the DVS software as a multi-clip.
Odetics protocol (RS-422)	Protocol for serial data communication similar to the 9-pin protocol but with an extended command set. See also RS-422 and 9-pin protocol. DVS supports the major commands of this protocol in slave mode.
operator	An editing effect that can be applied to video clips either as an embedded operator or as an operator set via the clip's timeline element properties.

outpoint (clip)	End of a clip. For video material either the last file on the storage or a last frame virtually set (trimmed) in the DVS software. For audio material either the last sample of a file or a virtually set (trimmed) outpoint in the DVS software.
outpoint (timeline)	The end of a timeline. It is either a user-defined outpoint or the last frame/sample of the timeline's content.
overwrite mode	Timeline mode during your work with timeline elements. When deleting or moving clips in the timeline gaps may appear, and by adding or moving timeline elements the contents of the timeline may be overwritten.
prerendering	The calculation and rendering of timeline elements prior to a play-out because they exceed the real-time capability of the DVS system.
preset effect	User defined settings of an effects operator. They are available as 'subeffects' under the respective effects operator in the tool area. With them you can apply the same settings of an effect over and over again in the timeline.
RS-422	Interface for serial data communication. See also 9-pin protocol and Odetics protocol.
scrub bar	A representation of a timeline in software. It provides a slider or cursor that you can use to move through the data of the material.
to scrub	To shuttle or perform a search run.
source timecode	Timecode information stored in the header of a file (e.g. in *.dpx image files). You can use the source timecodes, for example, in the timeline of the Edit Tool instead of the internal relative timecode provided by the timeline. If a clip does not contain source timecode information, it can be virtually provided with one.
tail	Material at the end of a clip that is available but neither used nor visible in a timeline of the DVS software due to an outpoint adjustment (trimming). See also head.
timeline cursor	Position indicator of the timeline.
timeline element	Video and audio clips or operators that are visible in the tracks of the timeline.
transition	A transition effect between two video clips.

vertical editing	To add timeline elements to other video tracks in the timeline than the first one. When different timeline elements occupy the same space at the same time in the timeline, the contents of a play-out can be easily changed at that particular position.
video clip	Usually, a folder/directory of the file system that contains frames (image files).
VTR	Video tape recorder. A device to record image and sound data magnetically on tapes.
VTR timeline	Timeline of the VTR task mode that provides a length of 24 hours. Video and audio material can be stored anywhere on the timeline. See the “Fuze I/O Tool” user guide.

A.2 Keyboard Shortcuts

For a more easy and a faster control of the Edit Tool there are various keyboard shortcuts available which are listed in the table below:

Action	Shortcut
Play (speed 1)	[Space], [5]
Stop (speed 0)	[Space], [K], [Shift + K]
Start play-out from inpoint	[6]
Increase speed by 1 (speed will be indicated in fps in play button)	[L]
Increase speed by 0.1 (speed will be indicated in fps in play button)	[Shift + L]
Decrease speed by 1 (speed will be indicated in fps in play button)	[J]
Decrease speed by 0.1 (speed will be indicated in fps in play button)	[Shift + J]
Step one (1) frame forward	[Right Arrow], [4]
Step one (1) frame backward	[Left Arrow], [3]
Step ten (10) frames forward	[Shift + Right Arrow], [2]
Step ten (10) frames backward	[Shift + Left Arrow], [1]
Jump to project begin	[Pos 1]
Jump to project end	[End]
Go to next cutting point	[Ctrl + Right Arrow], [S]
Go to previous cutting point	[Ctrl + Left Arrow], [A]
Activate insert mode	[;]
Activate overwrite mode	[']
Trim/move by one (1) frame forward	[.]
Trim/move by one (1) frame backward	[,]
Trim/move by ten (10) frames forward	[/]
Trim/move by ten (10) frames backward	[M]
Add edit/cutting point	[Shift + H]
Delete selected clip(s) in the timeline in overwrite mode (lift)	[Z]
Delete selected clip(s) in the timeline in insert mode (extract)	[X]
Set timeline inpoint	[E], [I]
Set timeline outpoint	[R], [O]

Action	Shortcut
Set timeline in- and outpoint at the cutting points of the current clip	[T]
Delete timeline inpoint	[D]
Delete timeline outpoint	[F]
Delete timeline in- and outpoint	[G]
Go to timeline inpoint	[Q]
Go to timeline outpoint	[W]
Add timeline marker	[Shift + N]
Zoom into timeline	[Up Arrow]
Zoom out of timeline	[Down Arrow]
Mute on/off video track #1	[8]
Mute on/off video track #2	[7]
Mute on/off audio track #1	[9]
Mute on/off audio track #2	[0]
Mute on/off audio track #3	[_]
Mute on/off audio track #4	[+]

Additionally, the following keyboard actions and shortcuts may be helpful:

Action	Key Action
Enter double-zero (00) in timecode fields	[.] (numeric keypad)
Deactivate snapping mode	Hold [Shift] key while working in the timeline with the mouse
Slave mode on/off	[Alt + S]
Select several clips and/or transitions disjointedly	Hold [Ctrl] key while selecting clips/transitions with the mouse
Select a range of adjoining clips and/or transitions	Hold [Shift] key while selecting clips/transitions with the mouse
Select all elements in the area that has the focus	[Ctrl + A]
Copy bin clip to a folder of the bin instead of moving	Hold [Ctrl] key while drag and drop of clip with mouse
Copy selected elements to the clipboard	[Ctrl + C]

Action	Key Action
Cut selected elements to the clip-board	[Ctrl + X]
Paste from clipboard to the selected position/location	[Ctrl + V]
Open Windows Explorer	[Windows ( ) + E]
Open Task Manager	[Ctrl + Alt + Del]
Switch to Windows desktop	[Windows ( ) + D]
Switch to another program	[Alt + TAB]

A.3 Supported File Formats

The DVS software supports over 100 graphic and image file formats. Most are made available by a special library. For a list of all these file formats see `http://www.xnview.com/en/formats.html`.

The tables in the following list the file formats that are supported by the DVS software directly. Some are video or audio-only file formats and some are container file formats that contain audio as well as video. They are listed accordingly in this section.

Some of the file formats …

- may belong to optional packages,
- may not be real-time capable,
- cannot be captured,
- may require the installation of third-party programs (e.g. **.mov*).

Video-only File Formats

The following video-only file formats (still image formats) are supported by the DVS software:

Format Name	Default Extension	File storage format	Description
BMP	**.bmp*	3 × 8 bit RGB and 4 × 8 bit RGBA	8 bit RGB file format with or without key. Windows bitmap format. Only uncompressed bitmaps are supported (no RLE compression).
Cineon[1]	**.cin*	3 × 10 bit RGB	10 bit RGB format. Subset of the ANSI/ SMPTE DPX file format. Flexible file format by Kodak, allowing for variable image headers.
DPX[1, 2]	**.dpx*	3 × 8 bit RGB and 4 × 8 bit RGBA	8 bit RGB file format with or without key. SMPTE Standard File Format for digital moving-picture exchange.
		8 bit YUV 4:2:2 and YUVA 4:2:2:4	8 bit YUV file format with or without key. SMPTE Standard File Format for digital moving-picture exchange.
		3 × 10 bit RGB and 4 × 10 bit RGBA	10 bit RGB file format with or without key. SMPTE Standard File Format for digital moving-picture exchange.
		10 bit YUV 4:2:2 and YUVA 4:2:2:4	10 bit YUV file format with or without key. SMPTE Standard File Format for digital moving-picture exchange.
		3 × 12 bit RGB	12 bit RGB file format. SMPTE Standard File Format for digital moving-picture exchange.
		3 × 16 bit RGB	16 bit RGB file format. SMPTE Standard File Format for digital moving-picture exchange.

Format Name	Default Extension	File storage format	Description
JPEG2000[3]	*.jp2 *.jpc	3 × 10 bit RGB	10 bit RGB file format. Flexible data and still image compression standard, operating either compressed or uncompressed.
		3 × 12 bit RGB	12 bit RGB file format. Flexible data and still image compression standard, operating either compressed or uncompressed.
		3 × 12 bit XYZ	12 bit XYZ file format. Flexible data and still image compression standard, operating either compressed or uncompressed.
SGI[4]	*.sgi *.rgb	3 × 8 bit RGB	8 bit RGB file format. SGI IRIX image format.
		3 × 16 bit RGB	16 bit RGB file format. SGI IRIX image format.
Targa	*.tga	3 × 8 bit RGB, 4 × 8 bit RGBA and 8 bit Luma	Targa image format. Only uncompressed variants of this format are supported.
TIFF	*.tif *.tiff	3 × 8 bit RGB, 4 × 8 bit RGBA and 8 bit Luma	TIFF or Tagged Image File Format in 8 bit RGB with or without key. Highly flexible and platform-independent image format. Not all variants of this format are supported.
		3 × 12 bit RGB, 4 × 12 bit RGBA and 12 bit Luma	TIFF or Tagged Image File Format in 12 bit RGB with or without key. Highly flexible and platform-independent image format. Not all variants of this format are supported.
		3 × 16 bit RGB, 4 × 16 bit RGBA and 16 bit Luma	TIFF or Tagged Image File Format in 16 bit RGB with or without key. Highly flexible and platform-independent image format. Not all variants of this format are supported.
YUV	*.qnt *.qtl *.yuv *.yuv8	8 bit YUV 4:2:2 and YUVA 4:2:2:4	Raw 8 bit YUV file format with or without key.[5] This file has no header. The image format is recognized by the file size. This is done with a table of predefined file sizes. Component order UYVY.
	*.yuv10	10 bit YUV 4:2:2 and YUVA 4:2:2:4	Raw 10 bit YUV file format with or without key. This file has no header. The image format is recognized by the file size. This is done with a table of predefined file sizes. Component order UYVY. Bits are packed tightly from left to right for three component samples, then two bits of padding (zero) to fill up to four bytes. The lines are padded to a multiple of four bytes. The file is padded to a multiple of 512 bytes.
	*.yuv16	16 bit YUV 4:2:2	Raw 16 bit YUV file format.[6] This file has no header. The image format is recognized by the file size. This is done with a table of predefined file sizes. Each component is stored as a 16 bit value in big-endian byte order (left-aligned). Component order UYVY.

1) *DVS saves files of this format by default in big-endian byte order. However, during loading both formats (little- and big-endian byte order) can be read.*
2) *Regarding the file type: V2 is the DPX file format according to SMPTE 268M-2003, the remaining (V1) are SMPTE 268M-1994. 'b.e.' stands for big endian, 'l.e.' for little endian.*
3) *Cannot be captured.*
4) *Not real-time capable. Available for loading only.*
5) *8 bit YUV 4:2:2 and YUVA 4:2:2:4: 8 bit per component, 16 bit average per pixel*
6) *16 bit YUV 4:2:2: 16 bit per component, 32 bit average per pixel*

Container File Formats

The DVS software supports the following container file formats for audio and/or video material:

Format Name	Default Extension	File storage format	Description
MPEG-1[1] MPEG-2[1]	*.mpg	3 × 8 bit RGB or 8 bit YUV (compressed + audio)	File format for the compression of video and audio.
MPEG-4[2]	*.mp4	3 × 8 bit RGB or 8 bit YUV (compressed and/or audio)	File format for the compression of video and audio as well as other media types. Based on the QuickTime file format.
QuickTime	*.mov	Various (e.g. RGB or YUV either compressed or uncompressed + audio)	Video file format that supports various file storage formats, either compressed or uncompressed. Proprietary streaming video technology developed by Apple. For finalizing the available file types depend on whether **Hardware finalize support** is activated or deactivated. 2K resolutions or above are supported when **File type** is not set to `QuickTime Conversion`.
Windows Media[3]	*.wmv	3 × 8 bit RGB (compressed + audio)	Video file format that supports various file storage formats. Proprietary streaming video technology developed by Microsoft. Only compressed variants are supported.

1) *A finalizing can only be performed compressed. Cannot be captured.*
2) *Available for loading only.*
3) *Available for finalizing only.*

Furthermore, the DVS software supports different variants of MXF (e.g. MXF OP-Atom, MXF OP-1a and P2; extension *.mxf) as well as DV (DIF; extension *.dv) files. Both are container formats for audio and/or video material. They are implemented with the following compression codecs:

Codec	Video Raster[1]	Video Bit Rates	Audio Bit Depth and Channels[2]	Format
XDCAM IMX	525i /29.97, 625i /25	30, 40 or 50	16 bit: 0, 2, 4, 6, 8 24 bit: 0, 2, 4	MXF OP-1a

Codec	Video Raster[1]	Video Bit Rates	Audio Bit Depth and Channels[2]	Format
XDCAM HD	1440 × 1080i /23.98 /25/29.97 (4:2:0)	18, 25, 35	24 bit: 0, 2, 4, 8	MXF OP-1a
	720p /50/59.94, 1080i, p /23.98/25 /29.97	50		
XDCAM DVCAM	525i /29.97 (4:1:1), 625i /25 (4:2:0)	25	16 bit: 0, 4	MXF OP-1a
DV25	525i /29.97 (4:1:1), 625i /25 (4:2:0)	25	16 bit: 0, 2	DV (DIF)
DVCPRO 25	525i /29.97, 625i /25, all in 4:1:1	25	16 bit: 0, 2, 4 (MXF), 0-2 (DV)	MXF (P2), DV (DIF)
DVCPRO 50	525i /29.97, 625i /25	50	16 bit: 0, 2, 4 (MXF), 0-4 (DV)	MXF (P2), DV (DIF)
DVCPRO HD	960 × 720p /50 /59.94, 1440 × 1080i /25 /29.97	100	16 bit: 0, 2, 4 (MXF), 0-8 (DV)	MXF (P2), DV (DIF)
AVC-Intra	960 × 720p /50 /59.94, 1440 × 1080i /23.98 /25 (4:2:0), 1440 × 1080p /23.98 /25/29.97 (4:2:0)	50	16 bit: 0, 2, 4	MXF (P2)
	720p /23.98/25 /29.97/50/59.94, 1080i /25/29.97, 1080p /23.98/25 /29.97	100		

Codec	Video Raster[1]	Video Bit Rates	Audio Bit Depth and Channels[2]	Format
DNxHD	1080p /23.98/24/25	36	16 bit: 0-16 Each audio channel will be recorded in a separate file. Recording 16 audio channels will generate 16 individual MXF files for audio (mono).	MXF OP-Atom
	1080p /29.97	45		
	720p /23.98/25	60		
	720p /29.97	75		
	720p /23.98/25, also in 10 bit	90		
	720p /29.97, also in 10 bit	110		
	720p /50, 1080p /23.98/24	115		
	1080i, p /25	120		
	720p /59.94, 1080i, p /29.97	145		
	1080p /23.98/24, also in 10 bit	175		
	720p /50, 1080i, p /25, all also in 10 bit	185		
	720p /59.94, 1080i, p /29.97, all also in 10 bit	220		

1) If not mentioned otherwise all in 8 bit 4:2:2.

2) Observe the limitations as indicated: For example, for DVCAM either four (4) or no/zero (0) audio channels have to be selected.

Audio-only File Formats

The following audio-only file formats are supported:

Format Name	Default Extension	Description
AIF AIFF	`*.aif` `*.aiff`	Audio interchange format. Platform-independent file format for sound. Capable of storing multiple mono or stereo channels.
BWF	`*.rf64` `*.wav`	Broadcast wave format. Platform-independent file format for sound. Extension of the Wave format capable of storing multiple mono or stereo channels together with metadata and enabling file sizes of more than 4 GB.
Wave	`*.wav`	File format for digital audio (waveform) data under Windows. Capable of storing multiple mono or stereo channels.

A.4 1D LUT Files

A one-dimensional look-up table (1D LUT) file defines values for color and/or gamma correction. Depending on the color depth, for each input value the file specifies an output value for each color component and the alpha channel (key). It is a plain ASCII text file that has to match the following properties:

- Lines starting with a hash (#) are comments and will not be evaluated.
- There is a designated line (designated with the color depth) for the four color component values (RGBA). For example, for 10 bit video data the lines will start with zero (0) and end with 1023.
- Each designated line consists of four values (RGBA). The separation is made via tabulators ([TAB]).
- The LUT file has to provide 1024 × 5 input/output values as used in 10 bit video mode. If you work with 8 bit video data, only every fourth value will be used from the LUT.
- The values have to be in incrementing order.
- The color component values have to be stated as floating point values between zero (0) and one (1).

After some comments, for example, about the file and its values the file starts to list the color correction values. Each line starts with the designation of the input value (bit depth), succeeded by the four color component values: first blue, second green, then red, and last the alpha channel.

This leads to the following syntax:

```
# Any comment
# Any comment
<input value>      <B>      <G>      <R>      <A>
```

A finished and complete LUT file may look like the following (value pairs in the middle left out):

```
# Any comment
# Any comment
0       0.009766      0.000000      0.000000      0.0
1       0.011719      0.000000      0.000000      0.0
2       0.013672      0.000000      0.000000      0.0
3       0.015625      0.001953      0.000000      0.0
4       0.017578      0.003906      0.000000      0.0
5       0.019531      0.005859      0.000000      0.0
...
1022    0.999023      0.988281      0.999023      0.0
1023    0.999023      0.991211      0.999023      0.0
```

A.5 3D LUT Files

Three-dimensional look-up table (3D LUT) files are used for color corrections and/or color space conversions by defining output color values for input values. They are available in various formats, either encrypted (e.g. *.e3d) or unencrypted (e.g. *.3dl or *.xml). This section describes the unencrypted 3D LUT files.

A.5.1 General Description

A 3D LUT file lists triplets of values for a color transformation. Depending on the color depth of the 3D LUT, each triplet of values (R'G'B') specifies the output values for a certain RGB node, i.e. the resulting mapped values of input values. The RGB nodes (input values) are not explicitly listed in a 3D LUT file. In a *.3dl file they are available in the first uncommented line of the file and determine bit depth and number of nodes for the 3D LUT. In an *.xml file these information are set as attributes of the 3D LUT tag.

The DVS hardware can handle 17 nodes in a 3D LUT with an accuracy of 12 bit, meaning 17 nodes for R times 17 nodes for G times 17 nodes for B ($17 \times 17 \times 17 = 17^3 = 4913$ R'G'B' values).

The nodes determine the RGB input values:

Nodes as, for example, listed in a *.3dl file (17 nodes, 10 bit):

```
0 64 128 192 256 320 384 448 512 576 640 704 768 832 896 960 1023
```

Resulting in the following RGB nodes:

# of node	R	G	B
1	0	0	0
2	0	0	64
3	0	0	128
	...		
17	0	0	1023
18	0	64	0
19	0	64	64
20	0	64	128
	...		
34	0	64	1023
35	0	128	0
36	0	128	64
	...		
289	0	1023	1023
290	64	0	0
291	64	0	64
	...		
4911	1023	1023	896
4912	1023	1023	960
4913	1023	1023	1023

For the 17^3 nodes 17^3 output R'G'B' values have to be set in the 3D LUT file. The first triplet describes the output value of the first node, the second triplet of the second node, and so on.

The numbers (lines) of an RGB node can be calculated with the following formula:

$$\#\ of\ node = 17^2 \times index_R + 17 \times index_G + index_B + 1$$

[indices range from zero (0) to 16]

Example for the node (768, 384, 192):

$$17^2 \times 12 + 17 \times 6 + 3 + 1 = 3574$$

In case a particular RGB value of an image's pixel is not directly described through a node, it has to be interpolated: The RGB nodes can be placed in a spatial graph (cube). Any input RGB value will be described by a set of surrounding RGB nodes:

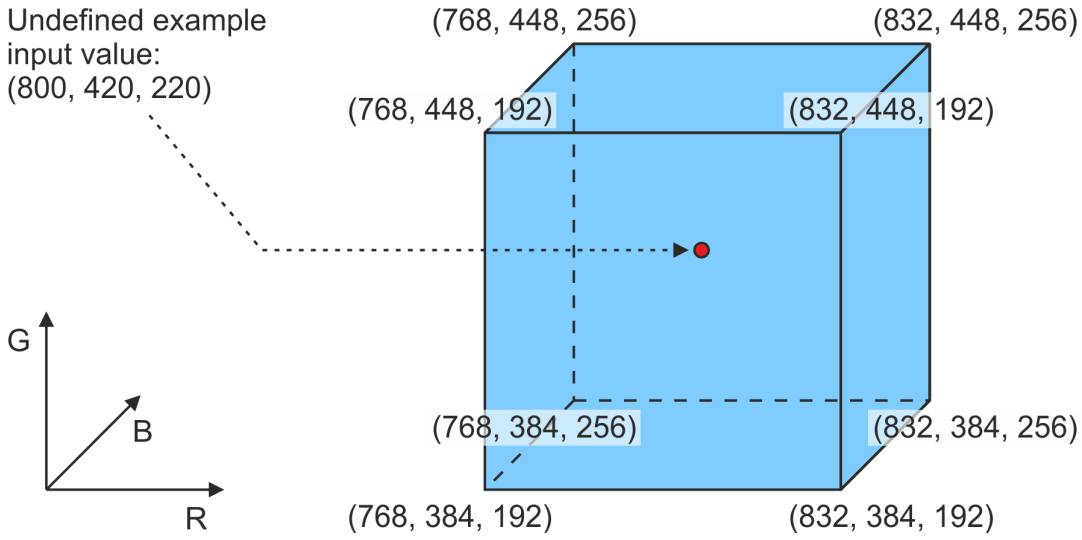


Figure A-1: Surrounding RGB nodes of an undefined input value

With the known look-up (output) values of these eight RGB nodes the required R'G'B' value can be calculated (interpolated).

A.5.2 3DL Files

A *.3dl* LUT file is a plain ASCII text file that has to match the following properties:

– Lines starting with a hash (#) are comments and will not be evaluated.

- The first uncommented line defines the input values (RGB nodes), i.e. the bit depth (e.g. if the end value is `1023`, than 10 bit) and the number of nodes.
- All following lines provide the output values (R'G'B') for one RGB node.
- Each following line consists of three values (R'G'B'). The separation is made by spaces.
- You have to define all $17^3 \times 3$ values and the triplets have to be in ascending order.
- The values have to be stated according to the bit depth between zero (`0`) and `<end value of RGB nodes>`.

After some comments, for example, about the file and its values the file starts with the input values. Then it lists the color correction values, leading to the following syntax:

```
# Any comment
# Any comment
<RGB nodes according to bit depth and # of nodes>
<R' of 1. node> <G' of 1.> <B' of 1.>
<R' of 2. node> <G' of 2.> <B' of 2.>
<R' of 3. node> <G' of 3.> <B' of 3.>
...
<R' of <# of nodes>^3. node> <G' of <# of nodes>^3.> <B' of <# of nodes>^3.>
```

The following shows an example of a 3DL file (10 bit, value pairs in the middle left out):

```
# Any comment
# Any comment
0 64 128 192 256 320 384 448 512 576 640 704 768 832 896 960 1023
   27     25     23
   27     26     23
   34     35     39
   41     43     51
   56     59     75
   87     88    117
  117    126    192
  120    122    252
   43      0    280
   98      0    334
  134      0    375
  159      0    404
  171      0    423
 ...
 1023    988    893
 1023    989    893
 1023    990    894
```

A.5.3 XML Files

A 3D LUT *.xml file is a plain ASCII text file that has to conform to the XML standard. It offers the following tags and attributes:

<LUT3D>	The root element/base tag that includes the other elements and tags. It should provide the following attributes:	
	name	The name of the 3D LUT file.
	N	The number of nodes, i.e. 17.
	BitDepth	The bit depth of the 3D LUT file.
<values>	Child element/tag that contains the R'G'B' output values for the RGB nodes. Each line consists of three values (R'G'B'). The separation is made by spaces. You have to define all $17^3 \times 3$ values and the triplets have to be in ascending order. The values have to be stated according to the bit depth.	

The following shows an example of a 3D LUT XML file (value pairs in the middle left out):

```
<LUT3D name='DVS Example 3D LUT' N='17' BitDepth='16'>
   <values>
     3113       0    2674
     3011       0    2341
     3055       0    2484
     2833       0    3307
     2721       0    4971
     3078       0    7032
     4249       0    9383
     5632       0   12272
     6910       0   15632
     7805       0   18808
     8417       0   21373
     8964       0   23256
     9366       0   24656
    ...
    65535   65395   57730
    65535   65378   57973
    65535   65368   58109
   </values>
</LUT3D>
```

A.6 Slave Mode / RS-422 Control

For slave mode the DVS system supports the RS-422 9-pin control protocol as well as a subset (major commands) of the Odetics protocol. When acting as a master the DVS system uses the RS-422 9-pin control protocol.

In case you want to control the DVS system in slave mode via RS-422, the following specifications have to be set on the master device to ensure frame accurate editing:

preroll	>= 1 sec.
edit lag (edit delay)	7 frames
postroll	1 sec.

A.7 System Maintenance

This section contains topics related to system maintenance work. Carry out the described tasks whenever necessary.

A.7.1 The Automatic Defragmentation Process

The DVS system provides an automatic defragmentation process for the connected storage that defragments previously copied or recorded data on the hard disk array so that they are more suited for real-time operations.

The automatic defragmentation process is supplemented by the defragmenter included in Spycer which can be used, for example, for a selective defragmentation of single clips. Further information about this can be found in the "Spycer" user guide.

Starting the Process

The automatic defragmentation process is automatically started together with the DVS software. It is then running in the background of the system and will operate during stand-still times.

The automatic starting of the defragmentation tool of the DVS software can be enabled or disabled via the Configuration Tool (see "Fuze Configurations" user guide for more information).

An automatic defragmentation will not be performed if real-time tasks (play-out or record) are running on your system or when the slave mode/VTR task mode is activated.

The process can also be started manually at any time when the DVS software is not running (see section "Starting the Process Manually" on page A-22).

Exiting the Process

Because the defragmentation process is automatically started together with the DVS software, it will be exited with it as well. As soon as the user interface of the DVS software is closed, the process will be halted and shut down as well.

Operation

When running, the defragmentation process reorganizes the files present on the storage during stand-still times of the DVS system. This means a defragmentation will not be performed under the following conditions:

- When the system performs real-time tasks such as a play-out or record,
- when the software is running in slave mode, or
- when the software is running with the VTR task mode of the I/O Tool activated.

If one of the above said is the case, no defragmentation will take place.

After starting the DVS software the defragmentation process is running in the background of the system. It operates in loops at certain intervals. Each time it is started it will go through various checkings and phases of defragmentation. Whether a defragmentation has to be performed is indicated by a special assessment that evaluates the fragmentation degree of the clips on the storage. Once a defragmentation is indicated, it will start by defragmenting the worst fragmented files and align them on the storage so that they are optimized for real-time tasks such as a play-out or a record. In its next cycle it will take other, not so worse fragmented files and so on, until all data is defragmented sufficiently. Afterwards in each cycle only the checking is performed until a fragmentation is detected once more.

When operating at regular intervals with sufficient stand-still times and a moderate acquisition of data, the storage of the DVS system will always be in a perfect state for real-time operations.

The DVS defragmentation process uses proprietary routines to defragment the data on the storage. The results will not be the same when using a third-party defragmentation tool, because it will not heed image file sequences. Therefore, do not use such for the defragmentation of the main storage.

A triggered defragmentation process is automatically halted as soon as a real-time task is performed or the DVS software is set to one of the other above mentioned states, and it will be started again when the software provides the operating conditions of the defragmentation process once more.

After copying or recording large amounts of data to the storage, it is recommended to leave the DVS software running for a longer period of time (e.g. over night) without performing any real-time tasks (play-out or record) or having the slave mode/VTR task mode activated. This will give the defragmentation tool time to reorganize the files on the storage for an optimized real-time performance. For this you may also start the defragmentation process manually (see section “Starting the Process Manually” on page A-22).

Starting the Process Manually

The defragmentation process can also be started manually, for example, if its automatic starting during the starting of the DVS software is disabled.

To run the defragmentation process manually perform the following:

Before starting the defragmentation process manually make sure that the DVS software is no longer running on your system. A manually started process forces a defragmentation at all times, meaning regardless of the state of the DVS system (e.g. real-time operation) a defragmentation will be performed. This may result in a limited real-time performance.

- Open a command line (for example, via ***All Programs » DVS » Maintenance » cmd***).
- Type in the command `avusdefrag <drive>`.

  The default value for `<drive>` is `V:`.
- After this press [Enter].

This will start the defragmentation of the storage.

During the defragmentation process the command line window will display the various checkings and phases of the defragmentation. Once finished with all phases, it will start again after a certain interval. Whether a defragmentation has to be performed is indicated by a special assessment that evaluates the fragmentation degree of the clips on the storage. Once a defragmentation is indicated, it will start by defragmenting the worst fragmented files first and align them on the storage so that they are optimized for real-time tasks such as a play-out or a record. In its next cycle it will take other, not so worse fragmented files and so on, until all data is defragmented sufficiently. Afterwards in each cycle only the checking is performed until a fragmentation is detected once more.

To terminate the manually started defragmentation process either close the command line window or press the key combination [Ctrl + C].

A.7.2 Cleaning Temporary Data Manually

When working with the Edit Tool, temporary data may be created to ensure a real-time capable environment. Temporary data can be pre-rendered files usually written to a location on your main storage especially reserved for this kind of data. In case you are not sure whether the temporary data in this directory is necessary, you can delete its

whole contents manually. Afterwards you may load your project file(s) again and begin new prerendering processes.

It is recommended to perform the procedure described in the following only when you are sure that the directory for the temporary data contains material for the respective project(s) only. For this it is best to use a project specific directory structure as described in section "Notes on Project Management" on page 2-11.

Do not delete temporary data manually while the DVS software is running.

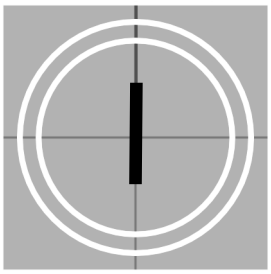
The path to the location of the temporary data is stored project specific in each project file. With the respective project file loaded in the Edit Tool, it can be found in the Configuration Tool of the DVS software (group **Project**, field **Path for proxy data**, see "Fuze Configurations" user guide).

- If applicable, shut down the DVS software.
- Open a file manager, e.g. the Windows Explorer.
- Select the project specific path of the temporary data on your main storage.
- Delete all files and directories stored in the respective directory manually.
- After that start the DVS software and load the project(s) in question.

Once each project is loaded, the DVS software recognizes that the temporary data is no longer available. For prerendering this means that all parts of the timeline that had to be prerendered are marked for a prerendering again (see section "Prerendering of Timeline Elements" on page 6-41). Then you may start a new prerendering process, for example, with the menu option ***Prerender all*** (see section "Prerender all" on page 8-11).

Once the creation of the new temporary data is finished, you can be sure that all files in the directory for the temporary data are valid ones.

After the creation of temporary data save your project file. If an already saved project file is not saved after such a process again, the temporary files will not be recognized by the DVS software when the project file is loaded once more: Neither will they be used for a play-out nor can they be deleted via the software. In such a case they have to be deleted manually again.



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